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PHYSICAL DIAGNOSIS

IN

OBSTETRICS.

A GUIDE IN ANTEPARTUM, PARTUM, AND POSTPARTUM EXAMINATIONS FOR THE USE OF PHYSICIANS AND UNDERGRADUATES.

* * *

BY

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* * *

WITH ILLUSTRATIONS.

* * *

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PREFACE.

THE most important and prominent change made in our system of medical education during the past two decades has been the increasing prominence given to clinical instruction. The inauguration of systematized clinical schools has had much to do with this. No course of instruction is considered complete which does not develop individual skill in direct examinations of patients. Among the various branches of medicine obstetrics has made one of the most notable advances of any. The student is no longer graduated with no actual knowledge of pregnancy and confinement. He is required to secure reasonable clinical training before he can graduate. This is an advance of enormous value. The physician in practice finds he must improve in his technique or be left behind the times. These changes in the situation have greatly stimulated the development of obstetrical clinical facilities. The writer has been engaged in teaching clinical obstetrics to both physicians and undergraduates for eighteen years and has found the need of the hour to be a book guide which shall follow the same order in its treatment of obstetric bed-side study as is pursued in institutions devoted to this work. Hence the publication of PHYSICAL DIAGNOSIS IN OBSTETRICS. It aims to represent on paper, and with more careful expansion of statement than could be given in daily verbal instruction by the side of the patient, the clinical study of obstetrics as the author has been accustomed to pursue it with his classes in hospital and dispensary work.

It has been found desirable by all teachers of clinical obstetrics to employ some definite printed chart form for recording the various features of each case of pregnancy. Such form naturally begins with the general and previous history of the patient as it related to her present gestation, taking up in succession the present conditions in the antepartum period, leading to the history of labor, the puerperium, and the care of the child. Hence the history chart naturally becomes an ever-present guide throughout the actual work. In the construction of the detail of such a chart the author has found it best to put into it the actual suggestion of every point to which he would wish the interne's attention to be drawn; otherwise, general questions only receive general answers. As the History Chart employed in this work takes up obstetric phenomena in their natural order and in the order in which they are brought out in actual personal teaching, it sensibly becomes a natural series of texts for consideration in detail. What to see, how to see it, what it signifies, and what can be done to bring the patient through her confinement with the best results; these are the steps in our clinical work,and these are the points which this book undertakes to teach in the same order and in the same way that they would be taught in the presence of obstetric cases.

While serving, therefore, as an expanded source of instruction to those physicians and undergraduates taking clinical courses in obstetrical hospitals, it will, it is hoped, prove most useful as a bed-side guide to those physicians who must rely upon their own cases for self-instruction and who are anxious to bring themselves up to the present-day standards of clinical obstetrical skill.

The remarkable improvement in obstetric work consequent upon the introduction of abdominal palpation and pelvimetry, but, more especially, in the establishment of complete diagnosis before labor, and the resultant prevention of many abnormalities in labors is the foremost triumph of obstetricians during the past fifty years.

Considering the aim of this work it has been thought best to omit bibliography or references to authorities as foreign to its purpose. This work has already been published serially in Obstetrics, in consequence of which certain minor errors have crept in, and is now issued in book form to carry out the original plan of making it a convenient guide in the work of present-day clinical obstetrics.

23 W. Fifty-third Street, New York City.
December, 1900.

Physical Diagnosis in Obstetrics

INTRODUCTORY.

DURING the last twenty-five years there has been a marked and gratifying advance in obstetrical teaching and practice in the extent of development in diagnosis. It seems strange that middle aged men of today are living witnesses to the practice that consisted mainly in seeing women for the first time only when in labor. Today no student in our higher medical colleges is permitted to graduate without practicing ante-partum examinations to some extent. And yet when the writer began a systematic course of instruction in this line sixteen years ago, there was scarcely any work being done as an essential or even optional part of the curriculum, in this country. An experience with many thousand physicians in the class room has shown how very small is the per cent. of those who are prepared to make a diagnosis as to the essential conditions present in a given case of pregnancy. The probable time of labor, and more or less care to avoid eclampsia, or rather albuminuria, summed up the attention granted by the physician in most cases.

Happily the standard is rising from day to day, and each graduate becomes a spur to his local co-laborers to improve his attainments. The next fifteen years will show a wonderful change in the customs of the profession in this important sphere of medical practice.

The Advantages of Ante-Partum Examinations.—The advantages of ante-partum examinations are of course limited to the extent that prophylaxis covers obstetrical complications. To cite only a few of the dangers confronting motherhood, consider:

Hemorrhage.—Placenta praevia is not often recognized prior to a hemorrhage during pregnancy, or in labor, or until an examination of the cervix is made during labor.

It is very difficult, generally impossible in fact, to locate the placenta in its attachment to the uterus, particularly when the fundus is the site. The placental bruit is practically unrecognizable with such means as we have at present. Some times we can locate the "storm center" of uterine circulation and thereby assume the placental cite to be at that place. It is easier however to locate a placenta when it is abnormal in its place of attachment. The writer has pointed out what he believed to be the placenta attached to the lower anterior segment of the uterus, and had the diagnosis confirmed in delivery in a number of instances. In central implantations, the most dangerous, it can some times be recognized in vaginal examintions before labor.

In the hands of an expert, placenta praevia if *forseen* adds much less additional per cent. of danger to the mother. While it will always be true that the majority of the cases of placenta praevia will declare themselves only after hemorrhage, we cannot let go the per cent. that is on the side of foresight.

Post-partum hemorrhages are generally due to uterine atony, and in so far as obstetrical diagnosis can prevent the evils of unnecessary complications, such as transverse, shoulder, breech, and locked twin presentations; and long delays and reliance upon forceps when a capital operation is demanded, and that should be performed promptly; by so much will the liability to post-partum hemorrhage be removed. No greater evil exists today in medical practice than this want of a system for fore-seeing these complications in labor. To make a sharp antithesis: for a physician to remain in ignorance of the dangers that threaten his patient until they declare themselves, is to allow the time to pass when he could be of greatest use; and in a perfectly normal case he might scientifically speaking almost as well stay at home. He becomes useless when needed and an ornamental figure-head when all is natural.

Mal-Positions.—There is but one ideal position for the fetus to occupy in labor, barring podallic deliveries in special cases, such as eclampsia and placenta praevia; and that is a head presentation with the occiput forward. That this position is taken automatically by the fetus, is proof that it is the easiest during later pregnancy; and a study of the mechanism of labor proves it to be the best adapted to delivery. That the fetus assumes a breech presentation during the later period of pregnancy argues that that may sometimes be the easiest for its adjustment, but not for delivery. Thus a woman suffers from hydramnion, and simply because of the abundance of amniotic water the uterus looses its usual pear-shape, becomes almost spherical, and the kicking fetus drives itself to any and every position, frequently into the breech presentation. In other cases the uterus seems to take peculiar forms that almost compel the fetus to lie in breech or other than head presentations. The position of the placenta low down, a fibroid in the lower segment, an ovarian tumor, fecal impaction, pelvic exostoses, pelvic deformities, cancer of the cervix, a pendulous abdomen, multiple pregnancy, etc., may cause such a position. In some conditions, notwithstanding the ordinary advantage in an anterior occipital delivery, it may be safer, in the choice of evils present, to allow a breech delivery. But in the ordinary class we must simply argue that no advantage comes from breech delivery in preference to the normal one, and we are brought to compare the dangers of the one with the other in their relations to the mechanism of labor.

The average infant mortality in head presentations, occiput anterior, is estimated at from 2–6 per cent.

In breech deliveries it is from 20–25 per cent. Not all cases of breech presentation can be corrected before labor, unless seen early in pregnancy,—the seventh month. Many such cases will correct themselves, some that are corrected will return to a breech.

The following rules apply: Do not interfere with a breech presentation in cases of placenta praevia, marked pelvic contraction, abnormal growths in or around the pelvic portion of the uterus, twins, when mobility of the fetus is too slight to render external version easy, when mobility is too great to render it likely that the fetus will remain in a head presentation, or after the breech has become impacted in labor. Perform external cephalic version when in the last four weeks of pregnancy the position in breech is becoming established, (the indications for this will be referred to further on,) and when no special reasons exist for a breech delivery provided such version is not difficult. Do not put the fetus in greater danger from version than from breech delivery. Choose, if the conditions allow, the last two weeks of pregnancy for doing version.

The liability of the occiput to rotate to the sacrum instead of to the pubes, can almost invariably be foreseen in a careful abdominal palpation. It is a comparatively simple matter to prevent this mal-mechanism in the end of the first stage of labor. External version will scarcely serve, but the hand can be introduced within the cervix at the time that it is well softened and fairly well dilated, and with the fingers passed to the occipital protuberance, (the right hand being introduced in occiput to the left, and *vice versa*,) enough purchase can be obtained to make an oblique anterior presentation, when forceps may be used just enough to fix the occiput in a safe anterior attitude. This is not meddlesome interference. It requires not one-tenth the manipulation needed for delivery in a finally determined posterior occipital position.

But while it is much safer it must not be misapplied. Transverse and shoulder presentations, with their attendant liability to prolapse of the cord, are conditions easily recognized, and generally not difficult of correction.

Such presentations are frequently due to placenta praevia, or a contracted conjugata vera, and might not call for primary correction, but their early recognition would be most valuable for whatever treatment might be employed. Now and then a patient will show a normal L. O. A. presentation in her ante-partum examination, and suddenly develop a tranverse or shoulder presentation following a sudden and great gush of amniotic water.

Such cases in no way affect the value of the plan under consideration.

Eclampsia.—The conditions that bring about eclampsia give clinical warning in a large proportion of cases. Scanty, or albuminous urine, constipation, dry feverish mouth and tongue, edema, headache, clammy skin, etc., often present without the development of convulsions, but the per cent. of cases supervening after treatment for the removal of such mal-eliminative symptoms, is very small.

Pelvic Insufficiency.—In pelvic contractions, irregularities, or fetal overdevelopment, careful measurements and estimates are absolutely essential to accomplish proper results in the management of dystocia. Constant practice in "obstetric tailoring," i.e., the determination of fetal to pelvic dimensions, size of the fetal head, the pelvic inlet and outlet, and the ratio of the one to the other, can alone develop the skill that is required to take at the start the one and proper method of delivery.

The history of craniotomy, symphyiotomy, embryotomy, and Caesarean section is a sad story of delay in recognizing the conditions present, and determining the proper treatment. Long delays and professional inaction, entailing most of the evils in the gynecological category, followed by tentative and purely experimental efforts with the forceps or version, bringing the patient and child without the field of successful delivery by any means, are largely the mark of neglect of utilizing ante-partum examinations.

Minor Obstetrical Diseases.—Every ante-partum examination gives more or less useful imformation that improves the forecast of labor and the lying-in period. The individual tendencies are brought out. Thus we may recognize a tendency to uterine atony, to thinness of the uterine and abdominal muscles, to hydramnion, to edemata, to varicosities, to mechanical retention of urine, to vaginitis and ophthalmia neonatorum, to cardiac insuffiency and to chronic ailments, and probably 80 to 90 per cent. of the harm they would cause could be avoided by being foreseen. Obstetrical practice is in many respects a close competitor with surgery in being exact in character.

CHAPTER I.

SCOPE OF ANTE-PARTUM EXAMINATIONS.

In the accompanying chart, to the elucidation of which this text is devoted, the plan adopted is to draw the attention of the examiner to every point that may in some case have a bearing either upon diagnosis, or prophylaxis, or labor management. That it is much more extended than would be required in every case, or even allowed by the patient, is quite evident. That there are some points taken up whose bearing is not, with our present statistics, fruitful, is also plain. The writer has made the chart as it is however, first that it may in the most obscure, or difficult cases, give all possible points of approach to diagnosis; second, that it may most thoroughly train those using it to skill in all directions, and third; that particularly in hospital work, unless every point is put down to be marked out or left, the reports will be most superficial and useless. A careful filling out of these charts almost covers a manual of obstetrics. It is the writer's experience that unless the students attention is directly drawn to given points, he will largely overlook them. Every case to be examined becomes an obstetric puzzle, and the enthusiasm its solution has awakened in the classes of the writer has been most gratifying, as it means a grand improvement in obstetric practice. To put himself on record before labor, as to the character of the labor, the ease, or difficulty with which delivery will be accomplished, the probable weight of the fetus, its position and sex, and to foretell what special treatment may be called for, the examiner must notice all points and carefully balance the one with the other, must in fact make a careful study of the case, having the reward of good prognostic ability as a stimulus to work.

The History Chart, published herewith, is a gradual evolution, representing the experiences gained in a number of year's practice and teaching in hospital work, and while some of its questions have no bearing on the individual case, yet a consideration of all is necessary to acquire proficiency in diagnosis and cultivate close observation.

It should be added here that some of the measurements called for will not give any conclusions until we have taken a larger number from which rules can be formulated.

A number of measurements under "Pelvimetry" here given are only intended to be taken when there is evidence of pelvic insufficiency. These are such as "the length of the sacrum," "of the cocyx," "the inter-ischial distance," etc.

The Attitude of the Patient.—It is often claimed that patients will not permit these examinations in private practice.

The writer has found it rare indeed where tact and a plain statement of what is to be done, laying stress on such points as determining the time of labor, and the sex of the child with many, and the value of foreseeing difficulties and *thereby avoiding them*, with the more sensibly inclined, would not gain ready permission, care being taken to avoid needless exposure. In some communities it is very difficult to overcome the customary prudishness that prevails, but here it is a matter of education.

Obstetrical History Chart.*

No................Date application.................................

Name ....

Address...

Age........Nationality.......................No. children.............

No. miscarriages............First pregnancy........Years ago..........

Character labor...
(State time of pregnancy, causes of prematurity; if at full term state

....
length of labor, shape of head (moulding), forceps, version, breech. etc.; weight, condition.)

Second pregnancy.................Third pregnancy.................etc.

Last menstruation......... ....Life felt.......................

Morning sickness from................to....... ....

ANTE-PARTUM EXAMINATION.

Date..................Height............ .....Weight.................

Previous diseases...
(Those affecting child-bearing.)

General condition...

Treatment...

Breasts projecting, pigmented, pendulous, scarred. Nipples prominent, pigmented, fissured, scarred. Abdominal wall: tense, flaccid, medium; thick, thin; inches; spherical, irregular. Elevated in $\substack{\text{L. U. Q.}\\ \text{R. U. Q.}}$ or $\substack{\text{L. L. Q.}\\ \text{R. L. Q.}}$ Linea abdominalis: straight, broken at umbilicus. Striæ: pink, white, absent. Edema: in right, left, foot; foreleg, thigh, vulva. Varicose veins in...

Developed in former or present pregnancy.

UTEROMETRY, PELVIMETRY, AND ABDOMINAL PALPATION.

Distance ensiform to fundus.........to umbilicus.........to pubic spine ....to right anterior sup'r spine..........to left anterior sup'r spine ....Umbilicus to right ant. sup'r spine............. to left ant'r sup'r spine..............Transverse diameter uterus..............Iliac

---

*That the reader may more readily understand the following chart, we follow it with another on which the history of a sample case is recorded.

crests............**Ant'r sup'r spines**.............**Trochanters**.............
External conjugate.........Pelvic circumference..........Uterus: tense, flaccid, medium: thick, thin. Amniotic fluid, over-abundant (Hydramnion.), abundant, sufficient, scant. Greatest amount in................quadrant of uterus. Fetal head at inlet, or in..............quadrant. Fetal body: movable, fixed. Highest point reached by body in right, left, middle of fundus. Back lies to right, left; anterior, lateral, posterior. Extremities felt in right, left half uterus; upper,lower quadrants; near ant'r, lateral, posterior line. Occiput: right, left; anterior, transverse, posterior. Head not pocketed in inlet. Displaceable: established. Cervico-occipital curve: acute, medium, obtuse. Head level in pelvic brim: high, medium, low. Head: large, medium, small. **Fetal heart heard in**.....................
quadrant. Point of greatest intensity............inches, right, left, linea abdominalis and........inches above, below, umbilicus. Pulse..........
Maternal................Location of placenta..................Estimated fetal weight..............at birth................male, female.

VAGINAL EXAMINATION.

Vaginal secretion, mucous, leucorrheal (white, yellow), gonorrheal; pruritis pudendi. Mucous membrane: normal, sensitive; pink, purple, varicose. Perineum: normal; lacerated, repaired. **Part fetus presenting**
.....................Distance head from pelvic floor: high, medium, low. Enters inlet: easily, difficulty. Cervix under the promontory: midway; long, short; thick, thin; flat, closed, open..............inches; lacerated; repaired. Internal os: closed, open. Placenta prævia: centralis; marginalis. Axis uterus: normal, ante-verted, pendulous. Uterine elevation: high, medium, low. **Diagonal conjugate**..................**True conjugate**
....................Thickness symphysis............Plane symphysis in, out at upper border. Height...................Coccyx to sub-pubic arch
......................Coccyx: flexible, inflexible. Angle sub-pubic arch, wide, medium, narrow, width...............Internal transverse diameter at middle plane..................Inter-ischial diameter..................
Summary of Pelvis: capacions, medium, contracted in.... ....
Bladder: behind, above pubes. Micturition complete; incomplete. **Urine in 24 hours**.........Color.........Specific gravity..........Urea........

Fronto-mental { .... / .... } Occipito-frontal { .... / .... } Cervico-bregmatic { .... } Sub-occipito-bregmatic { .... / .... } Occipito-mental { .... / .... } Defecation .... Micturition ....

Navel .... Fed by breast, wet-nurse, bottle. Composition bottle milk .... Amount .... Frequency. ....

Further history ....

Examiner ....

MATERNAL POST-PARTUM HISTORY.

Note—On the regular chart a bedside temperature chart occurs here.

Lochia: normal, scant, excessive, hemorrhagic, septic. Further history

....

....

Special history ....

....

....

(Note lochia, breasts, hemorrhages, medicines, stitches, etc., etc.

FINAL EXAMINATION.

Date .... Uterus size .... Diameter cavity ....

Position .... Mobility .... Tonicity ....

Circulation .... Secretion .... Endometrium ....

Cervix .... Perineum .... Bladder ....

Fallopian tubes .... Ovaries .... Breasts ....

Urine .... Anus .... Treatment indicated, pursued

....

....

Prominent features of the case ....

....

Date of discharge ....

Examiner ....

................................on delivery. Delivered unaided or by version, forceps high, low, or.................................Medicines given mother...Time..........
Effect........................Effect on child..........................
General condition mother after delivery................................
Pulse... ......Temperature..........Cervix lacerated slightly, severely; stitched. Perineum lacerated slightly, severely; stitched. Sphincter ....Placenta expelled in.............min. spontaneously, by manual compression, intrauterine extraction: complete, incomplete.
Placenta weighed...................Abnormalities......................
Place of attachment....................Cord history....................
Hemorrhage in 1st, 2d, 3d stage: sudden, slow. Source.... ....
Amount..................Treatment..................................
Further history..

BREASTS.

Large, medium. small: sufficient, insufficient. Nipples: elevated, depressed, eroded, fissured. Milk secreted in............ hours after labor. Abundant, medium, scant; thick, thin. Further history..... ....
....

CHILD'S HISTORY.

Male, female; alive, dead; normal, pallid, congested; weak; vigorous, asphyxiated, cryful. Resuscitated, method............. ....
Cord tied before, after lung expansion. Caput succedaneum. Location ....Head moulded, slightly, severely. Injuries..............

Pulse { at birth.......... / in 24 hrs .... } Respirations after resuscitation..............

Weight { at birth...............Abnormalities........................
at 7th day ....Circumference head at bi-parietal and sub-occip-bregmatic plane............
at 10th day............. }

Bi-parietal diameter { at birth........... / in 24 hours... ..... } Bi-temporal { .... / .... }

crests. 29 C.m.. Ant'r sup'r spines. 27. C.m. Trochanters. 31. C.m.. External conjugate 19. C.m. Pelvic circumference 90. C.m. Uterus: ~~tense~~, flaccid, ~~medium~~: ~~thick~~, thin. Amniotic fluid, ~~over-abundant~~ (Hydramnion.), ~~abundant~~, sufficient, ~~scant~~. Greatest amount in. R. L. ....quadrant of uterus. Fetal head at inlet, ~~or in...............quadrant~~. Fetal body: movable, ~~fixed~~. Highest point reached by body in right, ~~left~~, ~~middle~~ of fundus. Back lies to ~~right~~, left; ~~anterior~~, lateral, ~~posterior~~. Extremities felt in right, ~~left~~ half uterus; upper, ~~lower~~ quadrants, near ~~ant'r~~, lateral, ~~posterior~~ line. Occiput: ~~right~~. left; ~~anterior~~, transverse, ~~posterior~~. Head not pocketed in inlet. Displaceable: ~~established~~. Cervico-occipital curve: ~~acute~~, medium, ~~obtuse~~. Head level in pelvic brim: high, ~~medium~~, ~~low~~. Head: large, ~~medium~~, ~~small~~. **Fetal heart heard in** ..left lower quadrant. Point of greatest intensity. .2½. ...inches, ~~right~~, left, linea abdominalis and 1.......inches ~~above~~, below, umbilicus. Pulse. 156.... Maternal.. 76..........Location of placenta ....?...........Estimated fetal weight. 7 lbs.....at birth. 7¾ lbs... ~~male~~, female.

VAGINAL EXAMINATION.

Vaginal secretion, ~~mucous~~, leucorrheal (white, ~~yellow~~), ~~gonorrheal~~: ~~pruritis pudendi~~. Mucous membrane: normal, ~~sensitive~~; ~~pink~~, purple, varicose. Perineum: ~~normal~~: lacerated, ~~repaired~~. **Part fetus presenting** .Occiput......Distance head from pelvic floor: high, ~~medium~~, ~~low~~. Enters inlet: ~~easily~~, difficulty. Cervix under the promontory: ~~midway~~; long, ~~short~~; thick, ~~thin~~; ~~flat~~ closed, ~~open..................inches~~; lacerated; ~~repaired~~. Internal os: closed, ~~open~~. ~~Placenta prævia: centralis; marginalis~~. Axis uterus: ~~normal~~, ante-verted, ~~pendulous~~. Uterine elevation: high, ~~medium~~, ~~low~~. **Diagonal conjugate** 11½ C.m....**True conjugate** 10. C.m.......Thickness symphysis 1¼ c.m.. Plane symphysis in, ~~out~~ at upper border. Height...4 C.m.......Coccyx to sub-pubic arch not taken......Coccyx: flexible, ~~inflexible~~. Angle sub-pubic arch, ~~wide~~, medium, ~~narrow~~, width. 4. C. M....Internal transverse diameter at middle plane not taken..Inter-ischial diameter. not taken

Summary of Pelvis: ~~capacious~~. ~~medium~~, contracted in. conj. vera. Bladder: behind, ~~above~~ pubes. Micturition complete; ~~incomplete~~. **Urine in 24 hours** 1210 C.c.m. Color. straw.. Specific gravity. 1027.....

Albumen ~~..........~~ Casts ~~..........~~ Sugar Trace ..... Treatment ~~..........~~ slight Cystocele. ~~Rectocele.~~ ~~Constipation.~~ Hemorrhoids: ~~acute~~, chronic. Pregnancy single, ~~multiple~~. Change fetal position ~~probable~~, improbable. Abnormalities requiring treatment.................. **Probable time of labor** January 12th to 20th ...... **Probable character of labor**. ~~quick~~, ~~medium~~, slow Moulding of head: necessary, ~~unnecessary~~. Mother's strength sufficient. No ....? Operative interference indicated forceps, ~~high~~. ~~low~~, ~~version~~ ~~Cephalic~~ Podalic, induced labor ~~or~~ might be wise .... **Final diagnosis**. L. O. Transverse. Forceps may prove insufficient Examiner. J. P. M. ....

History of Labor.

Date Jan. 12th ..... General condition patient. good ..... Some constip'n .. Pains began. 1.30 a.m. ..... Fetal position L. O. A. .... Bladder ~~empty~~, full. Catheterized at 3 P.M. .... Amount 8 oz. .... Fetal heart heard to ~~right~~, left, ~~above~~, below umbilicus. Fetal pulse at 9.30 a.m. o'clock. 153 .at 3 P.M. .... o'clock. 140 just before delivery.. 140 .. Last defecation 1 P.M. ..... Enema given at 12.30 P.M. .... Occiput, ~~chin~~, ~~breech~~, ~~arm~~, ~~r. l.~~, ~~feet~~, ~~r. l.~~ not engaged at 3 P.M. ..... ~~Prolapsus funis~~ Fontanelle presenting ~~Ant'r~~, post'r. Axis sagittal suture. Right post'r to left ant'r .... Features of: face presenting ~~..........~~ Amnion ruptured at 11.10 a.m. Jan. 12 .spontaneously, ~~artificially~~. Fetal progress: ~~rapid~~, ~~medium~~, slow. Causes of delay: ~~maladjustment~~, ~~uterine insufficiency~~, ~~overdistension~~ (Hydramnion.), ~~resisting cervix~~, ~~moulding~~, ~~short or strong amnion~~, contracted conjugate ~~or~~ Occiput couldn't engage ..... large head, ~~or (hydrocephalus.)~~ Remained freely movable at brim ..... (Fibroids, exostoses, locked twins, etc.)

Caput succedaneum: slight, ~~marked~~. Vagina irrigated at ~~..........~~ with ~~..........~~ Fetus delivered at 4 P.M. 12th. Part presenting Occiput .... right, ~~left~~, shoulder under pubes. Occiput restituted to

Left on delivery. Delivered ~~unaided or~~ by ~~version~~, forceps high, Elliot's ~~low, or~~. Severe traction. Medicines given mother. Chloroform. Time. 2 30 P.M. Effect. anaesthesia. Effect on child delayed resuscitation. General condition mother after delivery. Good – Cervix swollen. Pulse. 81. Temperature. 99. Cervix lacerated slightly, ~~severely~~; ~~stitched~~. Perineum lacerated ~~slightly~~, ~~severely~~; ~~stitched~~. Sphincter ———. Placenta expelled in 18 Min. ~~min.~~ ~~spontaneously~~, by manual compression, ~~intrauterine extraction~~: complete, ~~incomplete~~. Placenta weighed. 602 gms. Abnormalities. Calcareous. Place of attachment Ant. fundus. Cord history 1 around neck. Hemorrhage in ~~1st~~, ~~2d~~, 3d stage: ~~sudden~~, slow. Source. Cervix. Amount 1 oz. Treatment. none. Further history. Sharp after pains.

BREASTS.

~~Large~~, ~~medium~~, small: sufficient, ~~insufficient~~. Nipples: elevated, ~~depressed~~, ~~eroded~~, left fissured. Milk secreted in 45 hours after labor. ~~Abundant~~, medium, ~~scant~~; ~~thick, thin~~. Further history left nipple argentum nitras – Rubber nipple for 5 days.

CHILD'S HISTORY.

~~Male~~, female; alive, ~~dead~~; ~~normal~~, pallid, ~~congested~~; weak; ~~vigorous~~, asphyxiated, ~~cryful~~. Resuscitated,-method. hot Sub aqueous + cold water. Cord tied ~~before~~, after partial lung expansion. " Caput succedaneum. Location L. parietal. Head moulded, ~~slightly~~, severely. Injuries. pressure mark.

Pulse at birth 136
in 24 hrs 144
Respirations after resuscitation. 41

Weight at birth 8 lbs. Abnormalities. ———
at 7th day
Circumference head at bi-parietal and sub-occip-bregmatic plane 37 C.M.
at 10th day

Bi-parietal diameter at birth. 10 C.M.
in 24 hours 10 1/4 "
Bi-temporal 8 1/4 C.M.
8 1/4 "

Fronto-mental { 8½ cm. / 8¼ cm. } Occipito-frontal { 12 cm / 12½ " } Cervico-bregmatic { 10 cm / 10¼ } Sub-occipito-bregmatic { 10.3 cm / 10.6 " } Occipito-mental { 13.5 cm / 13 " } Defecation 3 hrs Micturition 3 hrs

Navel normal Fed by breast, ~~wet nurse~~. ~~bottle~~. Composition bottle milk —— Amount —— Frequency 2 hrs

Further history normal

Examiner J. C. M.

MATERNAL POST-PARTUM HISTORY.

NOTE—On the regular chart a bedside temperature chart occurs here.

Lochia: normal, ~~scant,~~ ~~excessive~~, ~~hemorrhagic,~~ ~~septic~~. Further history Temp. 1st 1½° for 3 days. Movements bowels caused lowering of temp. & nipple tender 4 days.

Special history. Passed blood-clot Jan. 13. 7 a.m. Temp. normal after Jan. 1–th. Breasts increased amount milk. Ergot ʒss every 4 hrs 1 day

((Note lochia, breasts, hemorrhages, medicines, stitches, etc., etc.

FINAL EXAMINATION.

Date Feb. 5. Uterus size 8 cm. Diameter cavity 7.2 cm.

Position Slight r.version Mobility: normal Tonicity fair

Circulation sluggish Secretion White Endometrium firm

Cervix irregular Perineum Old cicatrix Bladder Sl. cystitis

Fallopian tubes normal Ovaries normal Breasts normal

Urine normal Anus Hemorrhoid Treatment indicated, pursued General hygiene. Exercise. Laxative. warm baths. etc.

Prominent features of the case Contracted conjugata vera. High forceps.

Date of discharge Feb. 6th

Examiner J. R. M.

Study of the Chart.—The general plan pursued in the accompanying chart is founded upon the belief and experience that that form which is good for hospital work, is equally good for private practice; that every point bearing upon a thorough examination should be definitely mentioned to avoid leaving too much to the imagination, and to render a statement on all possible points necessary. In difficult cases of diagnosis and prognosis, the more collateral evidence that can be secured, the greater will be the likelihood of securing an accurate forecast of labor. Experience has shown that for every line left blank, under the heading "general observations," there will be practically a blank history. On the other hand, by incorporating all possible points that may be answered "Yes," or "No," the examiner is obliged to observe and test each individual sign. While such a method calls for much that is not needed in simple cases, it cultivates the habit of thorough and extended observation, and is absolutely essential to develop expert ability in diagnosis and prognosis.

The classification of the different lines of investigation, as, for instance, uterometry and pelvimetry, that would be scientifically correct, requires some modification to adapt it to a natural order occurring in a clinical examination. Thus, the measuring of the conjugata vera would naturally be included under the division of pelvimetry; but in the actual examination of the patient, it is not desirable to make a vaginal examination for this point when a special examination for other points under this head must be made later on. The plan adopted, therefore, is to follow the theoretical classification as nearly as possible, making such exceptions in the order as are required for the convenience of the patient.

Obstetrical History.—The record of the patient, if pregnant heretofore, is always of value, showing whether abortions or miscarriages have taken place, and if any special liability to similar occurrences exist. Such histories have a bearing upon conditions relating to endometritis, to constitutional difficulties, such as syphilis, anæmia, etc., to uterine irritability, congestion, and, in fact, all conditions relating to such mishaps. If a child has been born, the character of the labor, position and weight of the child, the duration of labor, the means by which delivery may have been assisted, are always valuable as a line bearing on the approaching labor. We know, of course, that a woman may have a perfectly normal, easy labor, and in the next one experience grave difficulties. These cases are generally explained by the history of the previous labors. If we are in doubt regarding the capacity of the inlet or the easy passage of the fetal head, by reason of the fetal measurements obtained, but find by the patient's history that the descent of the head in the previous labor was easy and the child of greater weight than the one to be delivered seems to be, this history would have great value in withholding an unfavorble prognosis. The histories of previous pregnancies should be recorded in the order in which they occurred. This gives the clearest knowledge, not infrequently indicating the likelihood of difficulties and mishaps occurring in later pregnancies. Although brief space has necessarily been allowed here, the essentials can generally be recorded, while any case of special historical importance can be recorded on a separate sheet. In recording histories of abortions and miscarriages, state the period of pregnancy. This is to be obtained by the date of last menstruation or by personal knowledge of when impregnation might have taken place, and sometimes by a description of the fetus and membranes, the size of the fetus being the most likely point of assistance that would be given. Seek the cause of abortion, always making more or less allowance for unreliable statements bearing on its artificial production. Get as clear a record as possible of the question of its completion and the after-conditions of the uterus, seeking such points as the length of time of hemorrhage before the passage of the uterine contents, the amount and length of time such hemorrhage lasted after the contents were believed to have been expelled, whether much general weakness occurred, whether there was much fever, how long the patient was in bed, what treatment was employed, how she felt on getting up, whether she suffered from leucorrhea, and when menstruation was re-established. A similar plan is indicated in obtaining a history of miscarriages, seeking indications of subinvolution and displacement of the uterus. In histories of premature delivery the cause should be discovered if possible. In very fleshy women general anaemia, producing fatty degeneration, is frequently a cause. Albuminuria, more or less chronic congestions, or low forms of uterine inflammation, and especially syphilis, are common causes. The cause of continous premature death of the fetus is sometimes very obscure, but one of the foregoing will explain the great majority. Uterine adhesions must not be overlooked. Ventral fixation of the uterus for prolapsus, or a unilateral salpingectomy, or appedicitis causing extensive adhesions are prone to cause premature labor. Histories of previous labors at full term are chiefly valuable for their bearing on the dynamic capacity of the uterine muscle; and for estimating the relations of the fetal pelvic dimensions, particularly the latter. The histories of some women show curious and remarkable variations in the ease or difficulty of succeeding pregnancies. Thus, after several labors with delivery accomplished by severe forceps traction or craniotomy or version, the next labor is easy and the child born without assistance. The elements which go to provoke such apparently unaccountable variations are not always due to a difference in the size of the fetus. They may also be due to altered conditions in the pelvis, both in diameters and mobility, chiefly in mobility, as shown in Walcher's posture; to the mistaken judgment and haste of inexperienced physicians; to variations in paternity; and to positions of the occiput. Such cases, however, strongly indicate that the ratio of pelvic to fetal dimensions is on the border line of insufficiency. Some cases give a history of successive prolapse of the cord as well as great difficulty in delivery. These cases indicate inability of the head to enter the inlet, due generally to contracted conjugata vera, by which the head slides to one side from the promontory during contractions, leaving more or less space on the other side into which the cord passes after rupture of the amnion. It is usually difficult to get accurate statements as to the weight of the child, or even on most of the points just mentioned, and many of them will be obtained only after a medical cross-examination. In recording the period of the last menstruation, especial knowledge on the part of the patient as to when impregnation might have taken place, should always be sought, as this is, of course, much more accurate when obtainable. The question of the duration of pregnancy will be referred to in its proper place. Life is usually felt four and a half months after impregnation.

The following series of questions may serve to illustrate how a useful history can be obtained from even an uneducated woman:

When were you first in a family way?

When was the child born?

At what hour did your pains begin?

When did the waters break?

Did they break of their own accord?

When did the pains become hard and regular, say about every five minutes?

Were you given any red medicine (ergot)?

Did you take chloroform?

Did the child come away without help?

Did the doctor use instruments?

Did the child come away head first?

Did it cry, and how soon?

Was its head shaped like an orange, or a cocoanut?

Was there a soft swelling on the crown of its head?

How much did it weigh?

Did you bleed much, have fever, etc.?

Was the next labor harder or easier than the first one?

Did the child weigh more or less than the first one?

The information obtained by such histories, crude in parts though they may prove to be, will render more aid in forming an opinion of pelvic dimensions than careful pelvic measurements, not only to the general practitioner, but to the specialist.

"**Character Labor.**"—A labor may be classified as "easy," or "difficult," or "instrumental," or "operative." An "easy" labor must be determined from the standpoint of the physician, and not the patient, as otherwise we would seldom get this classification, pretty much all labors being "difficult," from the patient's point of view. A labor is "easy," when accomplished in about eight hours, if a multipara, and twelve hours if a primipara, beginning with the regular or rhythmic succession of uterine pains;* when the cervix flattens and expands with steady progression, and when the fetal head is engaged, without delay (it should engage by the time the cervix is flattened and dilated as much as two inches), when no moulding of the fetal head is necessary to accomplish descent, when the general and uterine strength of the mother is not put to any exhausting effort, and when the mother is not suffering shock, or exhaustion as a consequence of the power required to expel the child. All these statements are subject to many variations, but they average the conditions which constitute an "easy" labor. The fact that the cervix, or perineum may be torn, or the child be still-born, or severe hemorrhage occur, should not alter the classification. Labor may be classed as "laborious":

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*Note.—It is exceedingly important to form early in one's obstetric work a clear idea of the distinction between pains that are premonitory, or threatening, or preliminary, and those of real labor. Many a martyr parturiant has been put through the torture of ergot, artificial cervical dilatation, forceps, or version, through a misunderstanding of this distinction. Women may be days in this preliminary stage, the pains may disappear altogether, and the labor not occur for sometime after; and the one rule should be well understood that the best thing to do at this stage is to let the patient alone, particularly as regards examinations; simply giving such treatment as a light laxative, or gentle sedative, etc.

These pains do not affect the fetal life, nor exhaust the mother, except as they cause loss of sleep or appetite.

Very rarely one might meet with a case of inelastic and undilatable cervix, and stand off when he should assist, but this error is far preferable to the outrageous and hasty interference that has played such havoc in labor management.

1. When the rythmic uterine contractions are not followed by reasonable dilatation of the lower segment of the uterus and cervix. There is quite a variation in the behavior of the lower segment of the uterus in this regard, due in some cases to disproportionate strength in the part from Bandl's ring down, compared to that of the fundus, to a cicatricial construction of the cervix, to the attitude of the fetus, by which the fundus cannot cause the presenting part to exercise pressure against the internal os, (as in transverse positions, twins, etc.), to placenta prævia, tumors, contracted pelvis, etc.

2. It is "laborious" when moulding of the fetal head is necessary.

3. When the uterus tires before delivery is finally accomplished. This might occur simply because the uterine power is much below normal.

4. It may be "laborious," because of unusual strength in the amnion, which retards labor at times.

It should be borne in mind that the main idea in this classification, is to determine the general question of a given patient's ability to be delivered with reasonable ease, or otherwise, under normal conditions. Consequently we would, in aiming at a prognosis of a patient's approaching labor, exclude the fact that she had a laborious previous labor, if it was due to twins, or a transverse position, etc., if no such unusual or abnormal condition existed in the present pregnancy.

But if her last labor was laborious because moulding had to take place, and the child was of no greater size than the one to be delivered, it would have a direct bearing on the character of the coming labor.

A labor is "instrumental" when we are obliged to use the forceps, or perform version, or dilate the cervix with hand or bag, or replace a prolapsed cord, or handle the parts for placenta prævia. A labor is "operative" when the cervix is cut, or the head of the fetus crushed in craniotomy, or when symphysiotomy, or Cæsarean section, or embryotomy, is performed. To sum up: the main idea in the classification is to get the proper bearing of past labors on the prognosis of the one approaching.

"**Last Menstruation.**"—The aim here in this question is not whether pregnancy exists, but when it began. It is not possible to accurately name the time when a normal pregnancy will terminate in labor. First, because we cannot, except in cases of known single sexual intercourse, learn the exact beginning of impregnation, and second because there is a constant variation in the time of gestation. Our most helpful sign is the cessation of menstruation. The following facts must be considered in connection with this phenomenon: Impregnation follows coition most frequently in the week following menstruation, next in the week preceeding this, next in the second week after menstruation, and is least resultant in the third week after menstruation. When a menstrual flow has ceased, and impregnation occurs, it is exceedingly rare for it to recur during that pregnancy.

It may continue throughout pregnancy but not once in thousands of cases. Impregnation occurring just before or during a menstrual flow may not stop that flow, though in the great majority of cases it does.

Menstruation may be very irregular in the periods of its recurrence, or length of duration of each flow, or irregularly miss periods, or be absent altogether, all from other causes than impregnation. The individual history must be carefully sought bearing on these variations. The time of pregnancy should be calculated from *the day of cessation* of the last menstruation.

This only gives a date favoring the week following menstruation as the time when impregnation probably occurred. There are nearly three weeks following that time when impregnation might have taken place. Consequently normal gestations are more apt to run beyond the date given than end before it.

"**Life Felt.**"—Four and one-half months from the date of impregnation is the usual period for "quickening," but this is subject to much variation. It is, however, in the average of all signs that we find the surest guide to the time of labor; and the first feeling of life must be noted and given its proper part in deciding the question.

The patient's testimony must be taken with some doubt, as many are sure that they have felt life when we know that was impossible. Patients may go through a complete cycle of pregnancy in their imaginations, no fecundation having occurred.

"Morning Sickness."—The occurrence of nausea in the early weeks of pregnancy is the rule, though it may occur immediately following impregnation, or not until several weeks have passed, or not at all. It is not of much service in determining the time of labor.

It usually begins, if at all, following expansion of the uterus, at about the sixth week; but we must recognize that it may commence immediately following impregnation of the ovum. As this is supposed to take a number of days, the spermatozoa worming their way out into the Fallopian tube, where they meet the ovum, we are inclined to question the relation of vomiting to impregnation when occurring within a few hours after fruitful coition. We must believe that it must be purely reflex in some cases, and not dependent upon anatomical changes in the genitalia. The writer recalls a case of acute pernicious vomiting which necessitated an abortion in which the vomiting ceased for the first time in weeks immediately following death of the ovum, showing that the mere condition of pregnancy may excite emesis. The extent and character of morning sickness bear upon the prognosis both of pregnancy and labor.

Hyper-reflex women are not, so far as the writer knows, more prone to eclampsia,* but they are to anorexia, constipation, and those difficulties in labor due to an irritable and inelastic cervix, and such disorders favor eclampsia.

It is this class of "pregnants" that keep the doctor on the ragged edge of uncertainty when labor is expected, not knowing that they are in labor, but sure they are just about to be.

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* Bonnaire, *La Presse Med.*, Dec. 21, 1898, claims that the majority of cases appear in women with inherited tendencies to convulsions, epilepsy, etc.

CHAPTER II.

ANTE PARTUM EXAMINATION.

"When should the ante-partum examination take place" is a question that is frequently asked. The answer cannot be definite. The proper care of a patient during pregnancy involves many features which do not come up at any given time. Thus, the danger of eclampsia or placenta prævia may supervene in the fifth or sixth months; while an abdominal palpation for determining the fetal position at such a period would be quite useless.

An examination of the urine should, of course, be made many times during pregnancy. For the determination of questions relating to a single or multiple pregnancy, the fetal position, period of pregnancy, pelvic and fetal dimensions, the eighth month is generally the most desirable time. To take advantage of premature induced labor as a means of delivery in contracted pelves, this would be rather late in pregnancy. Such cases call for an examination at least in the middle of the seventh month.

To prescribe a working rule, the writer favors three examinations: One at the seventh month to note the condition of the kidneys, the period of pregnancy, the action of the fetal heart, the possibility of placenta prævia, and the dimensions of the pelvis; a second at the eighth month to note the fetal position and its liability to breech, shoulder or transverse presentation; and a third within two weeks of the expected labor to note all points bearing upon the approaching delivery. Alterations of this rule represent a compromise on the part of either patient or physician.

In the first examination we may observe by urinary analysis any abnormal tendency, also the development of edema or varicosity of the lower limbs, and constipation. By moderate regulation of the diet the action of the bowels, skin, and kidneys may be so regulated as to prevent conditions favoring eclampsia.

In patients giving a history of early death of the fetus in utero the early and successive examinations of the fetal heart with maternal treatment as indicated by the conditions, should be applied. The general effect of pregnancy upon the patient is also to be observed at such an examination. No patient is ever free from liability of eclamptic developments, and, of course, eternal vigilance is the price of escape.

It is as easy to make pelvic measurements at the first examination as at any later time, with the exception of that of the true conjugate, the vulva and vaginal tissues not being as distensible at this period as they are later on. A brief examination of the diameters of the iliac spines, of the anterior superior spines, trochanters and external conjugate will generally indicate the presence or absence of pelvic contraction. If these dimensions are of good average length, it is not necessary to take the true conjugate or other pelvic measurements. In some patients an exception should be made, such as those with rachitic tendencies, when it will be wise to make careful measurements of the pelvic outlet also. The writer believes that more will be accomplished for the maternal good by exercising a reasonable compromise in the matter of pelvimetry than if natural enthusiasm is allowed to carry us to ideal thoroughness in measurements. So many patients would object to complete measurements where there is no special indication for it that it would practically influence many really requiring such a thorough examination against allowing one to be made at all. It will be rare, indeed, that a case will not give some indication of trouble in the measurements named above, in which case an exception can be made and a thorough examination insisted on. More definite reference will be made to this further on. For the practical purposes of premature delivery, it is necessary that pelvic contraction should be recognized by at least the thirty-second week of pregnancy. Most cases of successful delivery by premature induced labor give a history of fetal death in a previous labor. A general systematic adoption of these examinations as here laid down would greatly improve the achievements of premature induced labor.

For obtaining the benefits of external version and the corrections of mal-presentations, it is difficult to lay down a rule.

This general statement will give a much better idea of the best plan than naming this or that time for making examinations. External version is useless if performed while the child is relatively small to the amount of amniotic fluid present, inasmuch as it will not retain the position in which it is placed, and there is a strong probability of its taking that position itself later. Version is generally impracticable after the fetus is well established in a given position. The ideal time for external version, therefore, is when the fetus is still movable, but becoming cramped. All possible exceptions to any given rule will occur. A very tightly fixed fetus in the breech a few days before labor may be found on precipitation of labor to give a head presentation, and *vice versa.* A very large percentage of abnormal presentations is found at seven months, which cases rectify themselves previous to labor. Nevertheless there is a general rule which directs us in this matter. It is not difficult to recognize, for instance, that there is a special tendency in a given case to a breech or transverse presentation. The writer has had case after case where a shoulder or transverse presentation was quite likely to occur, where, in fact, it had occurred in several previous labors.

" Height" and **" Weight."**—This is a convenient place in the examination for these points to be ascertained, as they can be taken before the patient is placed in the recumbent posture. All pelvic measurements are relative and never absolute in their bearing upon the question of fetal transmission. It may be stated as a general rule that where the patient is both tall and heavy, the pelvic dimensions should likewise be above the average, and *vice versa.* The average height of English women during the reproductive period is 5 feet 3 inches. (Robert's Manual of Anthropometry, 1878.) Their average weight is 124 lbs. (*ibid.*).

These figures do not correspond with those of my own investigations. In 550 pregnant patients, weighed mostly during the periods of pregnancy from the seventh month to full term, their average weight was, with their clothes, 139 lbs. 1 oz. The average weight of the clothes was, in winter, 7 lbs., and in summer, 4 lbs. Deducting the average 5½ lbs., and for the weight of the fetus 6 lbs., a total of 11½ lbs., the total actual average weight of non-pregnant women is 127 lbs. 6 oz.

The average height I found to be, with the shoes on, 5 feet 6 inches.

The nationalities represented were in the order following: American, Irish, Jew, German, English, etc.

In connection with these features of physical construction we should note the size of the bones in the general skeleton, and the proportions of bone, fat, and muscle which combine to produce a given weight. A patient may weigh much above the average from excess of fat and muscle, and really have a small skeleton and pelvic measurements below the normal size. The size of the hands, and particularly the circumference of the wrist, will usually give a fair knowledge of the bony framework.

Where the bones are all light, even delicate in character, we may expect the internal measurements of the pelvis to be somewhat greater than the external measurements would ordinarily indicate. The reverse is likewise true. The dimensions of the fetal heads are also apt to be greater in women of large frames and *vice versa.*

The writer was obliged to perform symphysiotomy in one case to secure delivery of a living child, where the external measurements were 12 inches for the iliac crests, 11½ inches for the anterior spines, 8 inches for the external conjugate, and 13½ inches for the trochanters, the child weighing 9 pounds 7 ounces. (Case VI,, "The Pubic Symphysis in Parturition," *Amer. Jour. Obst.*, Vol. xxxvi., No. 1, 1897).

"**Previous Diseases.**"—The patient should be particularly examined for a history of such diseases as may have a bearing upon her pregnancy. Prominent amongst these are rickets, syphilis, phthisis, heart disease, nephritis, and neurasthenia. Any evidence of a history of rickets, or Potts' disease, or hip-joint disease calls for great care in examining the shape and dimensions of the pelvis, both at the inlet, median plane, and outlet.

An exception is thus made to the rule, that unless the measurements of the crests, anterior spines, and external conjugate are less than normal, it is not necessary to take other measurements here given.

In these bone-deforming diseases we may find these measurements absolutely normal, yet there may be marked unilateral contraction or infundibular deformity of the pelvis with great reduction of its outlet. An extended discussion of the relations of various diseases to pregnancy does not properly belong to this work and must be omitted.

"**General Condition.**"—This heading should draw attention to all existing abnormalities, however slight, that may affect pregnancy and labor. Malnutrition from persistent vomiting or lowered tone of the nervous system does not often affect the fetus as much as it does the mother, and much can be done to lessen their degree and influence. In very fleshy women we will not infrequently find a tendency to premature death of the fetus without any history of syphilis, or other distinct disease, or local trouble to account for this so-called "habit." An anemic condition of the blood and improper oxidation of the placenta, leading to that secondary cause of fetal death—fatty degeneration of the placenta—is a common cause in this class of cases. Further reference to this broad heading must be omitted.

"**Breasts Projecting, Pigmented, Pendulous, Scarred.**"—There are a number of facts concerning the breasts that should be noticed during pregnancy—the eighth month being the best for making observations—as they will enable the patient to better prepare them for normal lactation.

A "projecting" breast is one that is fairly well developed in glandular structure, of firm consistence, well nourished, and does not sag and form a crease or sulcus along the lower border when the patient is erect. It is the "Amazonian" breast, and is usually found in primipara. If found in a case of multiparity it usually indicates that the patient did not nurse her child. Such a breast will not require support and is less liable to cakeing than when it is pendulous.

"**Pigmentation**" is of no importance other than for purposes of diagnosis of pregnancy. Possibly there is a fuller development of Montgomery's glands in a highly pigmented breast, and consequently greater liability to breast infection.

A "**pendulous**" breast is one that falls down upon the chest when the patient is erect, causing the nipple to lie more or less below the median horizontal line of the breast. Breasts become pendulous by reason of their great weight, or from atrophic changes occurring in the fatty tissue following previous lactation. The circulation in such breasts may be impeded by the sharp bend in the lower portion. This in turn may favor cakeing later on. Some support that will free the breast from any twisting may be useful.

A "**scarred**" breast is usually one that has had an abscess in a previous lactation. Such breasts are more liable to a repetition of abscess, though the abscess in the first instance was due to carelessness, as the free flow of the milk is interfered with by the scar tissues in the gland, creating stagnation dessication and decomposition of the milk.

One of the particular objects in the breast examination in the ante-partum period is to forcast the milk supply. We must be cautious in forming a judgment, unless the patient gives a history of having had plenty of milk before. Corsets have often repressed the development of breasts, so that even under the great stimulation and blood supply of pregnancy they do not expand.

FIG. I.
Nipple Normal.

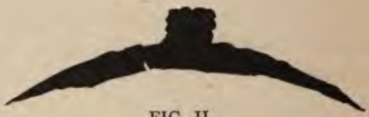


FIG. II.
Nipple Prominent.

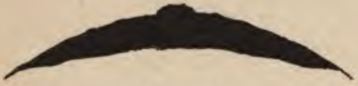


FIG. III.
Nipple Flat.

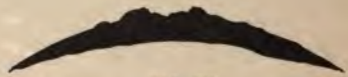


FIG. IV.
Nipple Depressed.

Some quite small breasts before labor will rapidly swell and apparently increase in permanent tissue after delivery. A breast may be very large and supply but little milk. An atrophic or flat breast should be gently massaged daily during the last month or six weeks of pregnancy.

The differentiation between fat tissue and glandular lobules is to be made chiefly by the greater size of the latter nodules. Under much stretching the skin may form striæ, in the same manner as they are formed on the abdomen.

"Nipples Prominent, Pigmented, Fissured, Scarred."—It is very desirable to get the nipples in the best possible shape and condition before labor arrives. A "prominent" nipple (see Fig. II.) needs no attention because of its prominence, though it may from being abraded, or fissured, or scarred. A depressed nipple (see Fig. IV.) may be so from under-development, due to asexual tendencies, or to pressure of corsets, or to the indrawing of the tissue by cicatricial scars. In the last case nothing can be done to improve it. Otherwise its growth and projection can be much increased by gentle pulling out every day, careful cleanliness being observed. A "fissured" or abraded nipple can be benefited and better pre-prepared to meet the rough treatment of nursing by daily cleansing with soap and water, and alcohol bathing, the use of zinc ointment, nitrate of silver, etc. Artificial nipples may be indicated.

ABDOMINAL EXAMINATIONS.

For greater convenience, the patient should lie upon a table or the edge of the bed, on her back, with the knees drawn up and resting easily so that there will be no strain upon the abdominal wall or restriction of its natural bearing. The abdomen being exposed, the order followed in the accompanying chart will be found most useful and convenient. For the best examinations, the bowels and bladder should be emptied.

"Abdominal Wall Tense, Flaccid, Medium."—This classification in differing extremes represents considerable variation. Thus in hydramnion and most frequently in primipara, the abdominal wall without being touched can be seen to be most tight and drumhead-like. In such a condition the contour is closely spherical, or, at least, has no bulging at given points. This condition is due either solely or in combination to an excess of amniotic fluid, intestinal distension by gas or feces, twin pregnancies, ascites, abdominal tumors, or resistance of the abdominal wall to the expanding uterus. The most frequent causes are amniotic fluid in excess and abdominal walls that do not as readily expand as the ascending uterus. It is a case of amniotic fluid in over-abundance, and there is every grade from normal to a severe hydramnion. The liabilities to mishap are greater in the way of malpositions of the fetus from the great amount of room it has in which to play, and, if that malposition is a breech, the danger of still-birth is very great. There is apt to be an anemic condition in both mother and child in these cases of marked excess of amniotic fluid. We may also be on the lookout for uterine insufficiency in the beginning of labor and greater liability to post-partum relaxation and hemorrhage after delivery of the placenta. The great stretching of the uterine muscle that occurs in cases of much over-distension weakens it both mechanically and physiologically. These patients should be examined as soon after labor begins as possible and a careful diagnosis made of the fetal position.

Inasmuch as fetal presentation in hydramnion is determined almost solely by gravity of its body, there being no fundal compression of the body with so excessive an amount of amniotic fluid present—there is great danger of prolapsus funis when the amnion ruptures. The fetus not being in snug apposition to the internal os, a rushing quantity of amniotic fluid can escape, even pushing the presenting part to one side, and *carry the light floating umbilical cord through the cervix into the vagina.* It is a wise rule to order patients, with hydramnion, to lie still in bed and in the lateral position, either until the waters have to some extent escaped or the physician has arrived. In hydramnion it may be best to rupture the amnion early and control the situation, preventing prolapsus funis and regulating the presentation. Such early rupture of the amnion, while distinctly an objectionable intervention generally, is not in such cases for the above reasons, and because some emptying of an overstretched uterus really assists it in applying its own power.

It may be desirable to dilate the cervix with Barnes' bag and perform cephalic version, if other presentations exist. Such interference by an experienced obstetrician gives less risk to the child, and is comparatively easy to perform on account of the abundant fluid present than leaving it in a breech presentation. The per cent. of still-births in hydramnion labors is very great, the causes being constitutional anemia, mal-presentations and weak delayed labors. Cases of hydramnion should be watched with special care in order to avoid post-partum hemorrhage, and should be given half drachm doses of fluid extract of ergot every four to five hours for twenty-four hours after delivery, unless contra-indicated. Where there is much tenseness in the abdominal wall, there is great danger of compression of the kidneys, of the uterus, of the neck of the bladder and of the veins from the lower extremities and vulva. These functional interferences point in the direction of eclampsia, and in their proper place in the examination should receive careful attention.

"Abdominal Wall Flaccid."—In this condition there is an increase in the lateral diameter of the abdomen, with a flattening of the supra-umbilical region, and the skin is rather loose and wrinkled. This condition is seldom present in primipara, and is most frequently found in poor women who have managed with very poor nourishment to put forth a baby annually for many years. The recti abdominalis are abnormally far apart, all the abdominal muscles are relaxed and lack tone. There is a special liability in such conditions to transverse and shoulder presentations, due to the want of perpendicular support to the body of the fetus, and the head naturally gravitates to the inlet, thus allowing the breech and trunk to fall to one side, followed by sliding of the head over to the opposite side, resulting in a shoulder presentation. (Fig. v.)

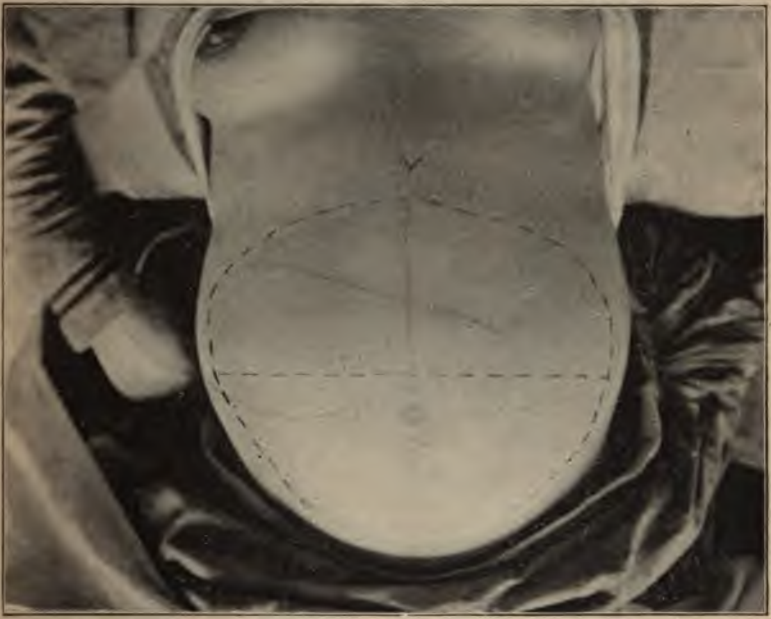


FIG. V.—Flaccid abdominal wall allowing he fundus to sag and causing an increase in the transverse diameter of the uterus. Shoulder and transverse presentations are favored in consequence.

"Abdominal Wall Medium."—This refers to the condition which we would call most normal. The contour is fairly rotund and spherical, with occasional marked deviations following the movements of the child, or passing contraction in parts of the uterus. (Fig. vi.).

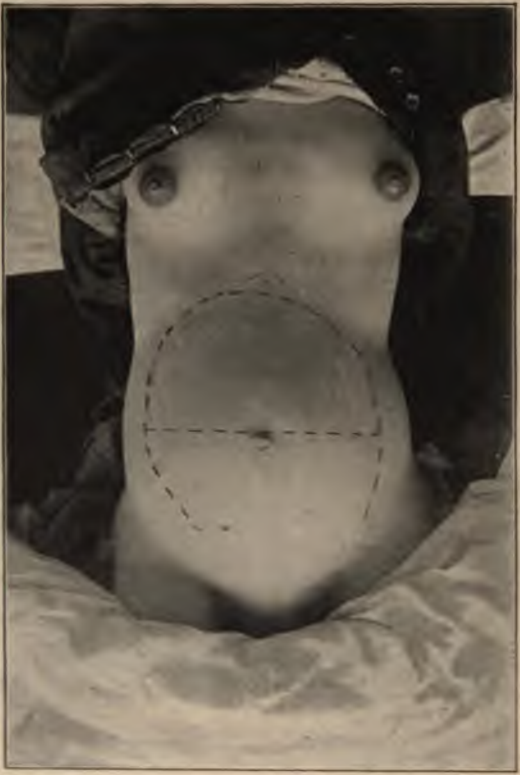


FIG. VI.—Normal tonicity of the abdominal wall, showing the support rendered to the uterus, by which sagging is prevented. Compare with Fig. V.

" Abdominal Wall Thick, Thin."—The wall of the abdomen varies from one-half inch, or less, to two and one-half to three inches in thickness, and such differences have an important bearing upon labor. In greater part, the variations in thickness are due to adipose tissue, otherwise to the extent of muscle and skin. Excess of fat, while not necessarily accompanied by muscular deficiency, or anemia, is apt to be, and in any case mechanically interferes with the abdominal muscles in their expulsive efforts during labor.

Abdominal assistance, in the efforts of the uterus to empty itself during labor, is often of great importance. Great thickness of the abdominal wall prevents in some degree the expansion and elevation of the uterus during pregnancy. One of the most serious possibilities for evil in this condition lies in its bearing on post-partum hemorrhage. Bi-manual compression, as suggested by Breisky, for checking and controlling post-partum hemorrhage, is altogether the best method, but it may not be possible in very fat patients.

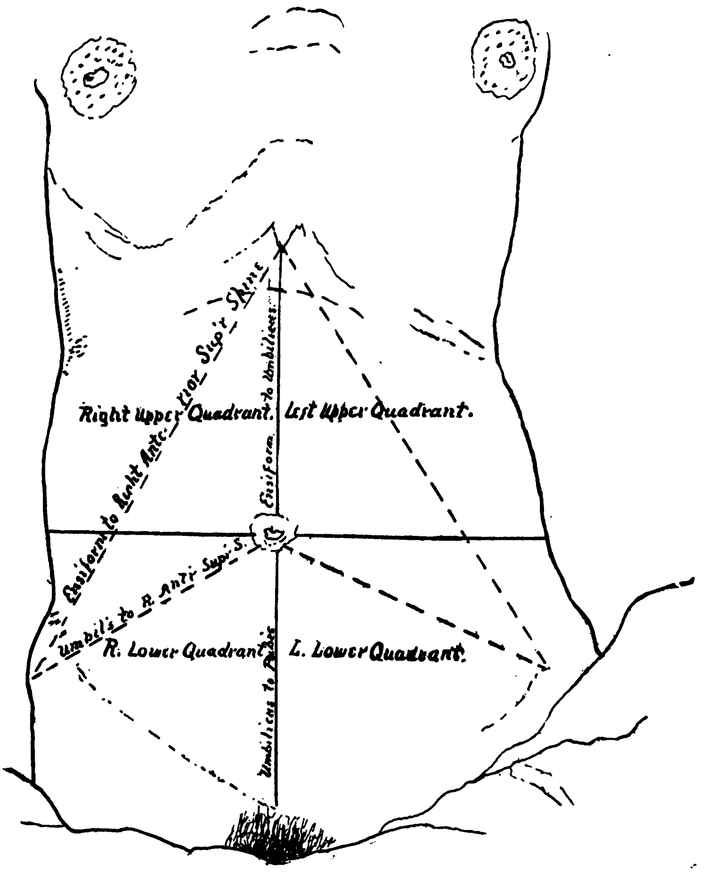


FIG. VII.—Diagram of abdominal measurements and divisions.

With the exception of the class under discussion, it is rare indeed for a skilled obstetrician to lose a life, or even have the

the swelling was unilateral; in Fig. x. it was bilateral, although similar in origin.

These cases were treated first by thorough cleansing, then by puncture and gentle pressure with antiseptic gauze, and binding with a T-bandage. Labor may be excited by puncture as followed in the first case illustrated herewith, but that is desirable rather than otherwise.

It is of great importance to remember that edema indicates lowered tone in the tissues, and that liability to infection is both greatly increased and its virulence vastly favored.

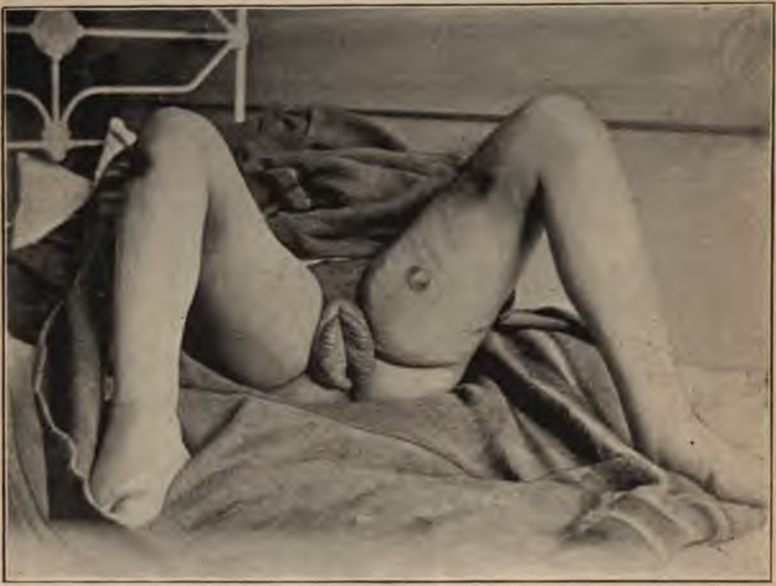


FIG. X.—Edema of Vulva in Primipara. It appeared in 33d week. Urine s.g. 1020; albumen .007 per cent.; 30 oz. 24 hrs.; casts, one eclamptic seizure ten days later. Recovery following accouchmente forcé. Author's Case.

Summing up the prognosis: Edema favors abortion, miscarriage and premature labor, eclampsia, infection, post-partum hemorrhage, and serous infiltration, or congestion of the respiratory and nerve centres. What has been written here of edema and infection should be held clearly in mind as regards the cervix during labor.

"Varicose Veins in ——."—Varicose veins may be found during gestation in the lower extremities, the vulva, clitoris, urethra, bladder, rectum, anus, and the veins of the broad ligaments.

Barnes' (System of Obstetrics, p. 316) has written such a classical description of varices that quotation is all that is left us. "Phlebectasis of the *lower limbs* may affect the *superficial veins* and the *deep veins*. The veins may be simply enlarged, or dilated with thickening, or dilated unequally; and there may be the changes in related veins called venosity. In the simple dilatation and the dilatation with thickening, the caliber is increased, but the form of the vein remains cylindrical. In the third form there are lengthening and flexuosity, the vein may acquire two or three times its natural length, and its coats alter; the middle membrane is thinned in parts, in others thickened. This produces projections into the cavity of the vein. Varicose bulgings are formed resembling aneurismal sacs. These dilatations are formed above or below the valvules. Sometimes the valvules are folded back, even torn. The circulation is impeded; thrombosis is favored."

Cornil has shown that new connective tissue is found in the veins, and venous sinuses result. In the case of large varices the surrounding tissues are thickened, lardaceous, and, in places, the appearance is as if the thinned compressible walls are tunnelled out of hardened tissue.

The deep veins of the limbs may become varicose and cause pain in the feet on standing.

Varicose veins in gestation are due to increased arterial tension and greater heart power—the hypertrophic heart of pregnancy—greater volume of blood, increased nervous tension, uterine pressure, and over-distension of the veins in labor—uterine contractions, which may induce a condition closely similar to that in the convulsions in eclampsia, and to forceps tractions. To this list should be added a general constitutional lack of tone, which permits venous dilatation from slight causes. Most cases of phlebectasis are due to several of the above causes acting together.

The veins of the labia majora, minora, vagina, rectum, and broad ligaments may also become varicose, even to most marked degrees.

In the labia they cause distention varying from slight tumefaction to blood tumors as large as a child's head at birth.

In the peri-urethral tissues they may cause such swellings as will extrude the parts without the vulva. They will have a deep purple hue and resemble the convolutions of the brain.

Varicosity should be looked upon as favoring eclampsia, by interfering with good elimination, which is primarily dependent upon a good circulation of the blood, and by causing congestion of the kidneys and deficient elimination through them. It should be looked upon as favoring lacerations of the cervix and perineum, by preventing thorough relaxation and stretching during delivery. It should be taken as a sign of severe labors in the past and lead to careful handling in the one to come.

During pregnancy it should be kept in abeyance by laxatives—compound licorice powder or fluid extract cascara sagrada are the best for this—by recumbancy as much as may be required, lying on the side chiefly, by elevation of the limbs or hips, and in severe cases of vulvar phlebectasis by a compression bandage. Cases may require keeping the patients in bed altogether, particularly where edema is also present. Hemorrhoids will be considered later.

CHAPTER III.

UTEROMETRY, PELVIMETRY AND ABDOMINAL PALPATION.

There may be said to be four prominent features holding the physician's attention in the care of a woman through parturition. These are: the presentation, the dimensions of the pelvis relative to the size of the fetal head, hemorrhage, and infection. He who is skillful in determining the first two points, who is a well-trained diagnostician, will be able to ward off most of the terrible evils that are liable to follow in the trail of parturition, and by mastering presentation and dystocia before labor, will greatly lessen the liability of hemorrhage and infection. He who is not prepared to obtain the facts of presentation and dystocia is not at all fitted to practice obstetrics. Uterometry and abdominal palpation will point out the fetal presentation, its normality or abnormality; its liability to change to better or worse; the threat of precipitate labor with its tendency to post-partum hemorrhage; dangers of prolapsus funis; of delayed labors from inertia; of dystocia due to mal-presentation; of twin labors; of placenta previa at times; of hydrocephalus, and many other abnormalities. Pelvimetry and fetal head measurement will fore-warn of delayed labor, of moulding of the fetal head, of threatened mechanical interference with normal mechanism of the fetal head, of uterine exhaustion, of the need of active interference, of *selection in time of the best methods for the completion of delivery*, with a consequent saving of over 50 per cent. in the mortality usual to such measures. Ignorance will treat all cases alike, will whip and lash the poor uterus whose every atom of power will be required to complete delivery with whisky and ergot, only to find when quick exhaustion follows that the maternal powers should have been nursed for a lengthened siege. There is no more crying need for improvement in medical practice today than in ante-partum diagnosis in obstetrics. The cobwebs of antiquity are upon this special feature of our science. We have but to read the details of the more capital operations of labor to find that in a sadly large proportion of them the conditions that finally demanded such treatment were not recognized in time to get the results that election could easily have obtained. And the cases reported are the best of the class; the histories of many others lie hidden with the victims underneath the ground. Diagnosis of obstetrical conditions necessary for the best results in treatment is not of such difficulty as to discourage, nor so uninteresting as to be a burden. Vaginal examinations are undesirable in parturition. The vagina is naturally aseptic, and the greater number of infections come from the transmission of germs from the vulva or the physicians hands. But to reduce the need of vaginal examinations to a minimum, we must get the most information possible by abdominal examinations.

UTEROMETRY.

Measurements of the abdominal surfaces require a fixed attitude and stable base on the part of the patient. It is necessary therefore for the patient to lie upon an unyielding bed or table.

A soft, yielding spring mattress causes shortening of the distance from the ensiform to the pubes, and of all intermediate points likewise. A cloth tape measure may be used, though the metal tape, which has the metric system on one side and the English on the other, is most accurate.

" Distance from Ensiform to Fundus."—In taking this measurement, the best method for defining the true apex of the fundus is to press the outer edge of the hand down just above the uterus, with the palm toward the pubes—which gives the best tactile result, and by covering the whole fundal upper border, demarcates it without displacing it. This measurement is an old and popular test of the period of pregnancy, Schultze's diagram showing the enlarging areas of the fundus as it advances toward the ensiform being a familiar illustration in many of our standard text-books. But many variations exist, affecting the degree of approach of the fundus to the ensiform, variations so great as to make the differences in measurements equal more than a whole month's equivalent. And we do not seek averages, i. e., that at the seventh month the fundus is two to three fingers' breadth above the navel, at the eighth month it is half-way between the navel and ensiform, etc., but the *rule in the case before us.* After the seventh month there will come into the equation elements that, unless considered, render our conclusions *nothiug but averages*—average results the product of average skill. There is quite a variation first in the degree of elevation of the uterus in the inlet. It may sink low in a capacious pelvis, so low that the

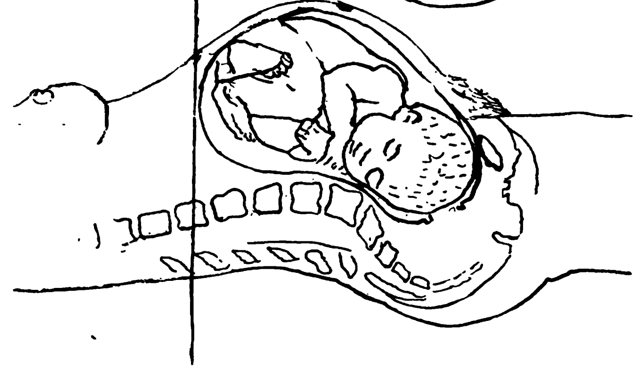


FIG. XI.—Fetal head resting neither high nor low, causing average elevation of the fundus uteri.

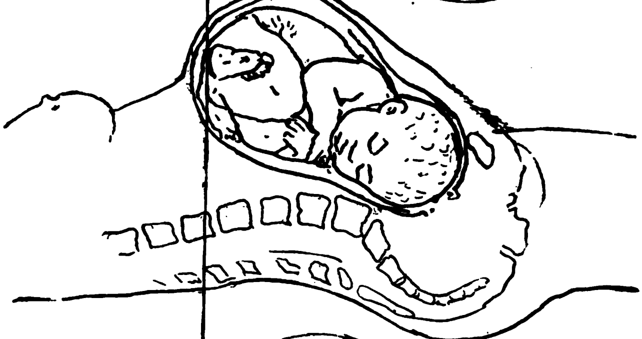


FIG. XII.—Fetal head resting "high" in the pelvis, causing elevation of the fundus uteri.

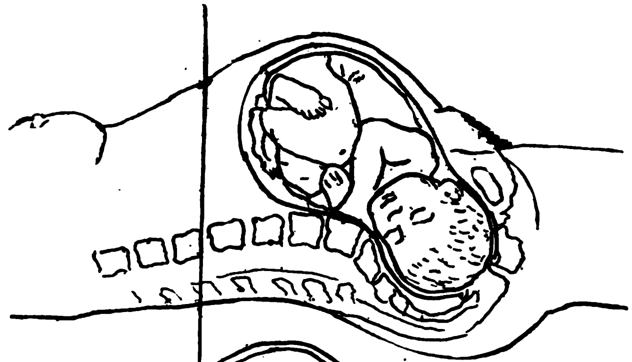


FIG. XIII.—Fetal head resting "low" in the pelvis, with the fundus uteri lowered as a result.

cervix rests against the inner perineal body, and if the fetal head sinks with it, a difference of 2 to 3 inches in the height of the fundus will result.

In many cases of pregnancy the fetal head lies low all through the last months to full term. Second, the reverse condition may exist, as from a contracted conjugate diameter, whereby the fetal head cannot even rest in the ring of the pelvic inlet, but impinges against the promontory and symphysis. This elevated position of the fetus will force the fundus much higher than normal.

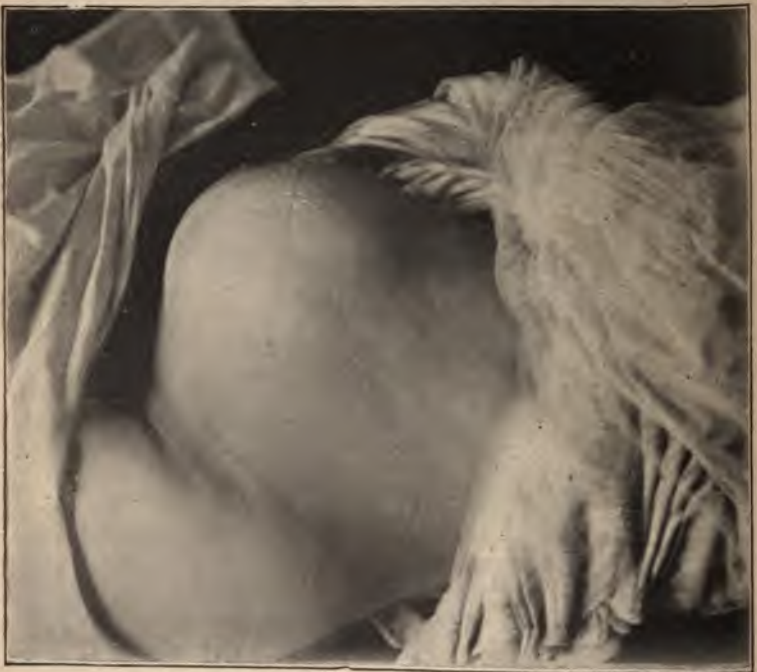


FIG. XIV.—Anteversion of the uterus, whereby the distance from the ensiform to the fundus is increased.

Figs. xi., xii., and xiii. indicate these variations. Third, the abdominal wall may be very tense and straighten up the uterus. This will bring it nearer the ensiform (see Fig. vi., p. 226). Or the abdominal wall may be much relaxed, and this will cause the uterus to sag laterally and so lower the fundus (see Fig. v., p. 173). Fourth, the axis of the uterus may be forwards, an anteversion, and this will lower the fundus from the ensiform (see Fig. xiv.).

The following table, compiled from seven hundred cases taken from my hospital history book, gives the average distance of the fundus at stated periods, the measurements being taken with the patient lying upon the back.

Table of average distances from the fundus to the ensiform:

NUMBER OF DAYS OF MEASUREMENTS BEFORE LABOR OCCURRED.

From..............	50 to 40	40 to 30	30 to 20	20 to 10	10 to labor
Average...........	11.6 cm. 4.5 in.	9.7 cm. 3.88 in.	8.3 cm. 3.22 in.	8 cm. 3.13 in.	7 cm. 2.77 in.

In 200 cases, representing an average of twenty-one days from date of measurements before labor, the total average distance was 7.7 cm. (3.1 inches). In twenty-nine cases of anteversion of the uterus, the measurements being taken at an average of 6.8 days before labor, the average distance from the ensiform to the fundus was 10.9 cm. (4.6 inches), showing that the fundus moves forward and downward from the ensiform. At the same time such anteversion is usually due to a want of room just beneath the diaphragm, and that in turn to the pelvis being small and the fetal head being held high in the inlet; or it is due to an excess of amniotic fluid and large fetus.

" Distance Ensiform to Umbilicus."—The umbilicus is not a fixed point during pregnancy. During the first half it moves slightly upward nearer the ensiform. In the latter half of pregnancy it may not return nearer the pubes, but it becomes farther removed from the ensiform. In cases of anteversion of the uterus it moves forward away from the spinal column. In cases of pendulous abdomen it moves in the arc of a circle around the pubes, and may rest some inches below the level of the pubes when the patient is standing (see Fig. xv.). It may move to the right or left, as has been heretofore stated. My hospital history book gives the average distance of the umbilicus from the ensiform during the last two months of pregnancy as 19.3 cm. (7.6 inches).

" Distance Ensiform to Pubic Spine."—Taken in connection with the known height of the patient, this measurement gauges the degree of general abdominal expansion in the anterior median line. It is of value therefore for estimating the volume of the amnion and fetus.

"Ensiform to Right Anterior Superior Spine."—"To Left Anterior Spine."—"Umbilicus to Right Anterior Superior Spine."—"Umbilicus to Left Anterior Superior Spine."—These measurements are of real value in showing that one side of the abdomen is more expanded than the other. In the majority of cases that side will be found to give the longest measurement which is chiefly occupied by the fetus, and the position usually held is that of the back to the corresponding side. Thus, in a left occiput transverse with the fetus lying well on its side, the measurements from the ensiform and umbilicus to the left anterior superior spine will be found on an average to be ½ to ¾ of an inch longer than the corresponding ones on the other side.

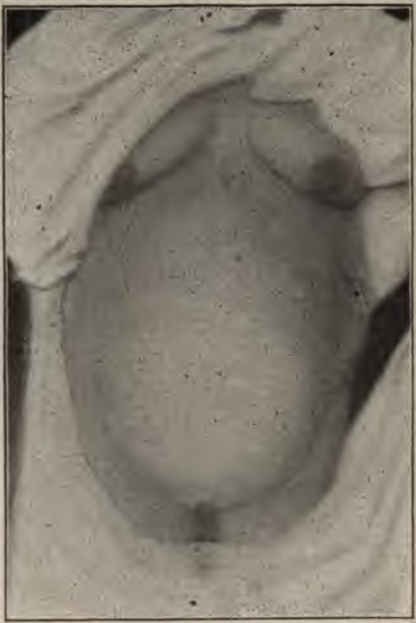


FIG. XV.—Case of pendulous abdomen. The distance from ensiform to umbilicus was 17½ inches.

"Transverse Diameter of the Uterus."—This measurement should be taken at the widest lateral diameter of the uterus, which will usually be after the seventh month about one inch above the horizontal line running through the umbilicus.

It is a valuable counterpart to the perpendicular measurements just named. It draws attention to the question of general conformation of the uterus, whether it stands upright or sags, and has a bearing on the prognosis of fetal presentation. In transverse presentations and twin pregnancies it will be found greater than usual. The average distance, as taken from my hospital book, is 22 cm. (8.6 inches).

Summing up these abdominal measurements, their chief value over and above the points mentioned above lies in their being the means of causing accurate observations of variations that would be overlooked altogether. They develop expertness in the study of abdominal facies.

Further reference to Uterometry will be given as it presents in the order of examination of patients.

PELVIMETRY.

Pelvimetry, the mensuration of the bony pelvis in a pregnant woman, seeks to determine the diameters of the true pelvic basin. Inasmuch as there is normally very slight difference in these diameters and those of the fetal head which must pass through the pelvis in delivery, and reduction in pelvic dimension is liable to obstruct such passage, it becomes at once a matter of prime importance, if such reductions are at all frequent, to secure means of learning pelvic diameters before labor. It is difficult for a student of midwifery to believe that parturition is, generally speaking, in a state of normality. We are prone to believe that when moulding of the fetal head is necessary to accomplish delivery, such a case is abnormal. The mother may not have a contracted pelvis, for the fetus may be of abnormal size, but while the hinged construction of the cranial bones of the fetus suggests an expectation of moulding, such labor modeling cannot be looked upon as aught but objectionable if avoidable.

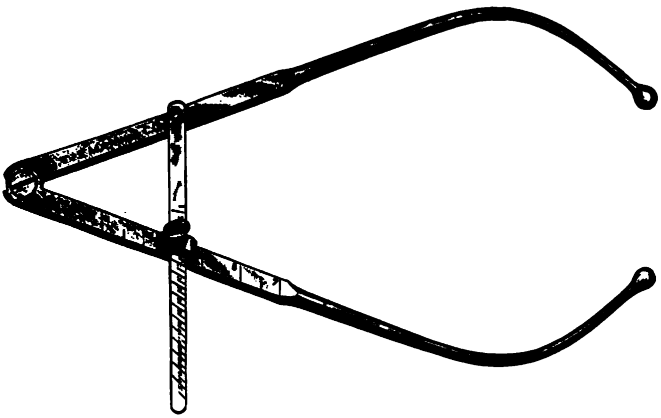
What Constitutes a Normal Pelvis.—It is difficult to answer this question. Obstetrically speaking, that pelvis is normal whose component bones have the proper shape and thickness, with diameters sufficient to permit the passage of the head of an average sized fetus at full term without moulding and without interference with the normal mechanism of labor. But the average of all pelves is not normal in a given case unless the patient is also average in height, weight. age, thickness of bones, etc.

The fetal head may be over-sized, but this would not justify our calling the pelvis contracted. Many equations are to be considered in determining the normality of a pelvis. They will be considered further on.

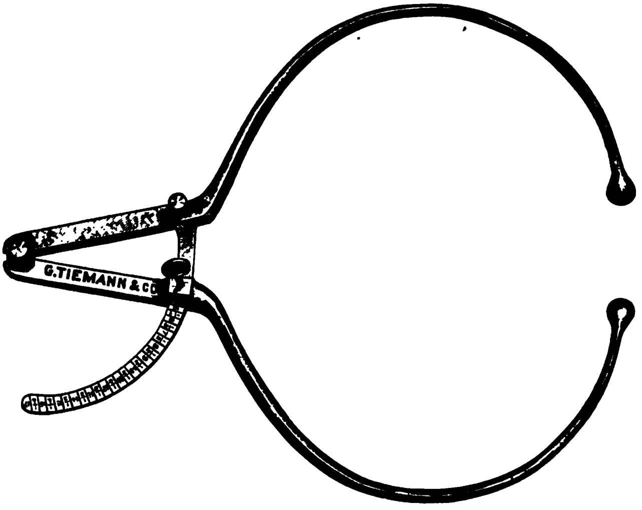
Frequency of Contracted Pelvis.—No more unstable statistical question can be raised than this. Different writers have had no fixed rule for a base on which to work. To measure several thousand women and deduct from the measurements that so many are "contracted" is absurd.

Most little women's pelves would be classed as "contracted." To take the labor history of dystocia or mechanical interference as a test would be also false, inasmuch as many women might give birth to undersized children and yet have contracted pelves. Statistics should be made up by a study of each case by itself, considering the weight, height, and age of the father and mother, the sex of the fetus, etc., etc. The general average of contracted pelves, as given by Williams, is 13.1 per cent. (OBSTETRICS, May, 1899, p. 246). Without further particularizing, it is enough to state that contractions of the pelvis are of such frequency and have such important bearing upon labor as to render a study of pelvimetry not only desirable but imperative. Nor need we fear that our efforts in estimating pelvic and head dimensions are going to prove futile because of the many equations composing the problem. There is no more fascinating medical work than this—forecasting the passage of the fetal head through the maternal pelvis. It is not safe to say that such work is a science—it is as much an art—it is a mixture of both science and art.

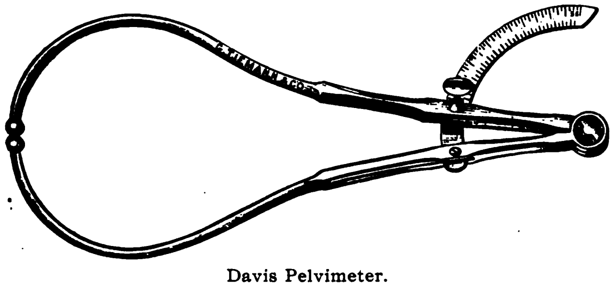
Moderate practice in pelvimetry will lead to the truth in the majority of cases, and a prognosis founded upon it improves directly in proportion to the amount of practice and care employed. There are no persistent dimensions that may stand as normal either in the measurements of the maternal pelvis or



Schultz Pelvimeter.



Bandelocques Pelvimeter.

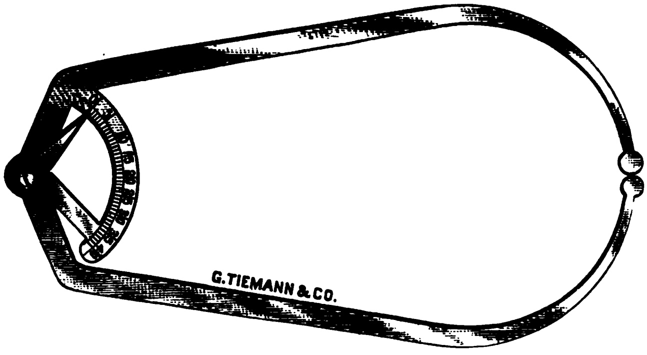


Davis Pelvimeter.

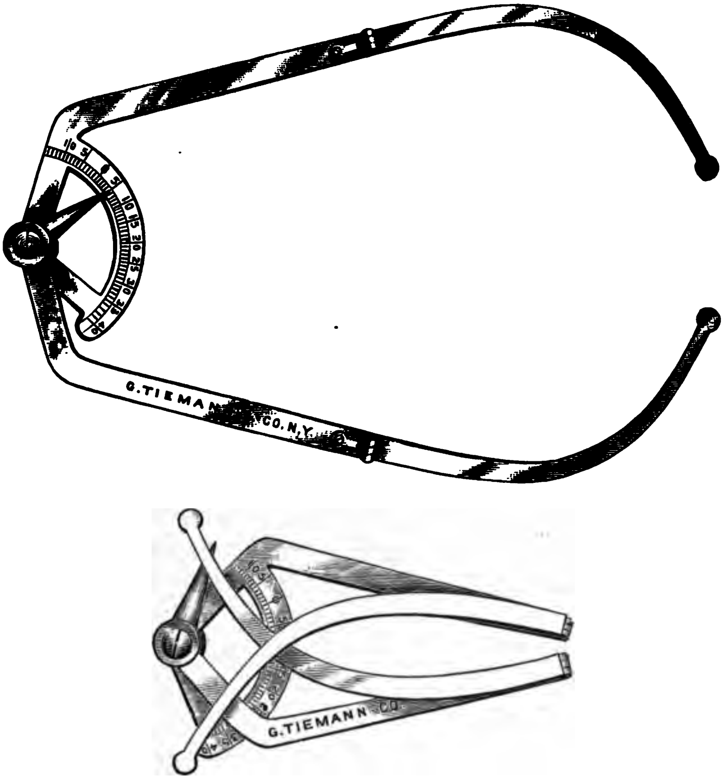
of the fetal head, for it is true that the variations in the length of pregnancy and in the size of the fetal head at birth are in themselves sufficient to permit one labor to be normal and the next abnormal—a genuine dystocia. The variations in the size of mothers is sufficient to render the average standard of measurements misleading. Thus a woman weighing 100 pounds and giving pelvic measurements of 10 inches to the "crests," 9 inches to the anterior spines, and 7 inches to the external conjugate, would not be classed as having a contracted pelvis as much as a woman weighing 200 pounds would with corresponding measurements of 11, 10¼, and 7¾ inches. Pelvimetry therefore calls for comparisons in the general size of the mother to the average woman and the corresponding allowance in her measurements compared with those accepted as the average.

It calls for consideration of the physical individuality of every case. Such, for instance, as the general length of the skeleton, the size of the bones, the amount of fat and muscle entering into the general construction. In applied-pelvimetry we should include, before interpreting the measurements obtained, a consideration of the age of the mother, the number of the pregnancy, the weight of the father, the probable sex of the child, and its weight.

Following the law of probabilities, obtained by averages, the fetus is smallest in parents under twenty years of age, larger from twenty to twenty-five, and on to the largest from thirty to thirty-five, and then followed by a decrease in size. That the father affects the dimensions of the fetus is well shown in Engleman's reports (Labor Amongst Primitive People). Among the Umqua Indians it was the rule for the squaw to have trouble in delivery, due to the unusual size of the fetal head, whenever a white man was responsible for the gestation, while otherwise labor was an easy procedure. In multipara a knowledge of the weight of previous children is a guide to the weight of the one under consideration. The dimensions of the fetus will, however, be taken up under another heading. Flexibility in the pelvic joints must be carefully considered. Women of forty, pregnant for the first time, are not so elastic in their joints as young women or multipara of the same age. The usual softening and slight widening of the symphysis is less



Harris Pelvimeter.



Dickinson's Pelvimeter.

with them, the variation in the curve of the sacro-lumbar joints, which is probably the accountant for Walcher's theory regarding engagement of the fetal head, is lost, and, most of all, the flexibility of the coccyx, by which about 3/16 of an inch increase in the diameter of the obstetric outlet is gained, is lost to a large extent.

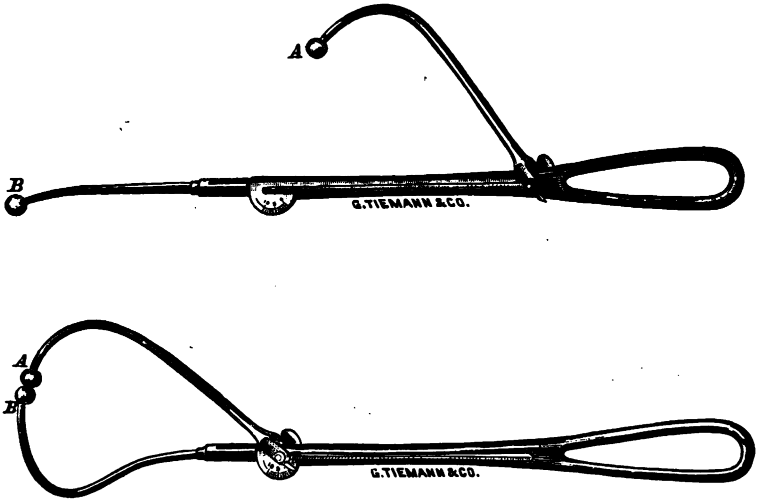
In taking the measurements of the pelvis, the physician should stand at a given point, by preference upon the patient's right, looking toward her head, and with the scale of the pelvimeter nearer the feet. Greater accuracy is obtained in manipulations taken from a given position. It might be well for every physician to test the accuracy of his pelvimeter by comparing it with the steel tape at the different points. Some instruments are accurate on their scale at one measurement and quite "off" at another, showing that their graduation scale is not correct.

"**Iliac Crests.**"—To obtain this measurement, hold the pelvimeter with the palms of the hands, lightly grasping the terminal rods so that the tips of the index fingers extend slightly beyond the end bulbs, and with the scale index nearest the chest so that it can be read while taking the measurement. Then slide the index finger tips along the outer ridges of the iliac crests until the points of widest divergence are found. In patients with much underlying fat, some allowance should be made in the figures. When the subsequent measurement of the anterior superior spines show them to be as wide as those of the crests, an indication of rickets, the points of selection for measurement of the iliac crests should be about 2½ inches further back. The average distance apart of the iliac crests is 10⅞ inches (28 c.m.).

"**Anterior Superior Spines.**"—Students show a tendency to error in taking this measurement. By starting with the finger tips along the crests and moving downwards along the ridges, the angular projections of the spines can be located with comparative ease. The bulb tips of the pelvimeter should be placed upon the fascia lata that is felt as a tense, somewhat elastic band, closely attached to the spines. The average of this measurement is about 9⅞ inches (25 c.m.).

"**Trochanters.**"—The patient's knees must be close together and the limbs extended in taking this measurement.

The average distance is 12 inches (30.5 cm.). If any special difference exists between the right and left limbs, as in cases of congenital paralysis of one leg, there is apt to be a deficient development of the acetabular region of the corresponding side, which may seriously affect the mechanism of delivery. The distance should be ascertained from each trochanter to the symphysis, to be followed by careful measurement of the internal middle plane of the pelvis, and of the diameters of the outlet.



Hirst Pelvimeters.

"**External Conjugate.**"—It is not always necessary to place the patient on her side in taking this measurement, as there may be sufficient curve in the lumbar region to allow the instrument to be placed against the sacro-lumbar point while the patient lies upon her back.

The points of application of the pelvimeter for taking the external conjugate are the dimple which is felt just below the spine of the last lumbar vertebra posteriorly and the anterior surface of the symphysis anteriorly, at a quarter of an inch below its upper border. This measurement is of more value and significance than those just mentioned, and should always be taken with great care. A difference of an inch in the measurement may be obtained by a slight error in placing the measuring tips of the pelvimeter. If the posterior one is placed below the proper point, the diameter obtained will be too short, and cause the examiner to fear the difficulties of a narrow conjugata vera. The posterior point can be most surely obtained with the patient lying upon her side, and with the muscles of the lumbar region quite at ease. The lumbar spines then define themselves more readily, and less doubt is felt as to when the last spine is found. We should endeavor to place the anterior tip of the instrument just within the superior commissure, and so get it nearest the pubic bone.

The average diameter of the external conjugate is 7⅞ inches (20 cm.). Some writers make it 7½ inches.

In attempting to forecaste the character of a given labor, we give considerable weight to the dimension of the external conjugate. We cannot specify, but in a general way it may be said that we may expect a delivery in a woman of average weight, with fetus of 7 lbs. weight (estimated), where the external conjugate measures 8 inches, and where no special abnormalities exist, without moulding of the fetal head.

With an external conjugate of 7½ inches, we may expect moulding; and of 7 inches sufficient obstruction to render assistance "probable."

"**Pelvic Circumference.**"—In taking this measurement, place the tape about 1 inch below the upper sacral border, bring it forward just under the iliac crests, and over the upper half of the symphysis.

The average measurement is a little less than 36 inches, or about 90 centimeters. The chief value in this measurement is in showing the presence of a justo-minor pelvis. Considerable increase in the measurement may be due to overlying fat or muscle, for which a careful allowance must be made. It may be said that unless the previous measurements of the pelvis show it to be of less diameter for the patient's weight and height than the average, we can safely omit this measurement.

Pelvimetry will be further considered as it occurs in the chart system of examination, measurements of the "outlet" being taken with the "vaginal examinations."

ABDOMINAL PALPATION.

"**Uterus Tense, Flaccid, Medium.**"—This question is closely bound up in that preceding of "abdominal wall tense, flaccid, medium," but there is enough differentiation to call for individual consideration. The abdominal wall may be tense while the uterus is not. Pregnancy complicated with ascites, a cystic ovarian tumor, or over-distended intestines will cause the abdomen to be tense, while the uterus may only be cramped by outside pressure, which, if relieved, would leave it soft and flaccid. On the other hand, the uterus may be tense while the abdomen is flaccid. This condition may be found in the earlier period of hydramnion—the seventh month—or in multiple pregnancy in a multipara with relaxed or pendulous abdomen.

To determine the degree of uterine tenseness or flaccidity, it may be necessary to introduce a finger in the vagina and make combined palpation of the uterus.

"**Thick or Thin.**"—It is, of course, not possible to accurately determine the thickness of the uterine wall, but it can be estimated, and conditions found that bear, to some extent, upon our method of treatment of a case. Thus, in excess of amniotic fluid with overstretching of the uterus, it is at times best to rupture the amnion early in labor, although rupturing the amnion is generally not to be performed.

Recognition of the thickness of the uterine muscle is best attained by palpation of the fetal body, and estimating the amount of abdominal and uterine tissue lying between it and the fingers.

"**Amniotic Fluid Over-Abundant, Abundant, Sufficient, Scant.**"—The first and last of these divisions represent pathological conditions. The remaining two are normal variations that nevertheless bear upon the character of the labor, and therefore aid in prognosis. The condition of hydramnion threatens in three prominent particulars, i. e., malposition of the fetus, loss of uterine power, and death of the fetus from lowered vitality. Malpositions are favored on account of the great amount of amniotic fluid present in proportion to that of the fetus. The forces that normally bring about head presentations are considerably nullified, the fetus having abundant room in which to kick and move about, and having gotten into a breech or transverse, may remain there. The per cent. of abnormal presentations in hydramnion is greater than it is in normal amniotic conditions. Loss of uterine power is due primarily to the conditions that cause hydramnion. Patients in this condition are generally anemic, with an increase in the per cent. of water in the blood. The mechanical interference of the over-distended abdomen with the functions of heart and lungs aggravates the evil. In addition to structural weakness, the uterus is put to a mechanical disadvantage in its individual muscular fibres by the severe distension and stretching. The recti-abdominalis may be forced apart and more or less partial hernia of the uterus result. The uterus has unusual difficulty in "getting under way." This is one of the few conditions in which early artificial rupture of the amnion is justifiable and desirable. It should be done, however, only under special indications, and it should be the aim to remove only a part of the fluid.

If the first stage of labor is unduly slow, we must remember that the patient, being of sub-normal vitality, is apt to become exhausted before labor is accomplished. The physical signs of hydramnion are easily distinguished. We cannot make the diagnosis a matter of figures, nor is there a definite dividing line between hydramnion and simple excess of amniotic fluid, but we must be guided by our knowledge of relative degrees of abdominal distension, and the recognition of the amount of fluid felt under palpation.

The abdominal wall is very tight, with but few exceptions, and drum-head like in character. The uterus feels highly resilient and will not permit any deep palpation of its contents. The outlines of the fetus are either not felt at all or made with indefinite results. Palpation had best give place here to tapotement—light taps with the tip of one finger made over the abdomen, whereby the floating fetus can be more or less felt ere it has time to move away to deeper parts. A succession of such tappings at different points will sometimes make very clear the outlines and position of the fetus. We may be obliged to rely upon the vaginal examination and the position of the fetal heart for a diagnosis, the same as in cases of very fat abdominal walls.

The corrections of mal-positions in this condition is not easy, but well within the capacity of a good obstetrician. The most desirable form of correction—Wigand's external version—is seldom possible, consequently cephalic version must be done, if at all, in the first stage of labor. It therefore becomes necessary to be in attendance upon such patients in the very beginning of labor.

That we are justified in undertaking cephalic version within reasonable conditions is because the mortality to the fetus is extraordinarily great otherwise. The slow labor, the anemic condition of the mother, the asthenia and poor aeration of the blood of the fetus (due to the interference of the stretched uterine wall with the flow of maternal blood through the uterine sinuses), and the added labor in breech and other abnormal presentations, combine to cause a futile ending for the child. When the cervix has softened and flattened and dilated to about two inches diameter, and is easily stretched, the hand can be gently introduced, the patient lying upon the back, some of the fluid evacuated, the head grasped and brought to the inlet with the occiput forwards, and a quicker, safer, and more normal labor will ensue. Such a method will in the average produce better results than non-interference if done by experts, but not in the hands of others. There is great danger of post-partum hemorrhage in cases of hydramnion which should never be overlooked and which therefore means its avoidance. Oxytoxics should be given for twenty-four hours after labor.

"**Amniotic Fluid Abundant,**" refers to those cases in which, while the condition is quite within the range of a normal labor, the amount is above the average. The special point bearing on prognosis is the liability to a mal-presentation following a sudden expulsion of the fluid in the early stage of labor. A patient may carry the fetus in the best head position, be walking about during the period of dilatation of the cervix, and following a sharp "pain" with a quick gush of amniotic fluid, the head may be carried to one side and a shoulder, arm, or foot present, and in an incredibly short time become impacted. A patient of the writer's was found to be in most normal condition a few days before labor, the head being in the L.O.A. position. While walking during pains, the waters suddenly escaped, and by the time the patient was placed on the table in the hospital, a shoulder presentation was *established*, all the waters expelled, and version rendered impossible. While it would be impossible to avoid such accidents in all cases, we can, by foreseeing the liability, advise our patients to keep in bed until we have made examinations and become assured of a retaining presentation.

"**Amniotic Fluid Sufficient,**" means that the objections of a "dry" labor will not prevail.

"**Amniotic Fluid Scant,**" draws our attention to a condition for which nothing can be done in prophylaxis, but suggests the use of anesthetics in labor, as the fetus is more liable to suffer uterine compression and asphyxiation. Version will also be inutile. The labor will be more painful than otherwise."

"**Greatest Amount in R. (right) L. (left) U. (upper) L. (lower) Q. (quadrant) of the Uterus.**" This condition differentiated is an aid to diagnosis of fetal position. If, for instance, we find the right lower quadrant largely occupied with fluid, it strongly indicates that the fetus is lying on the left side of the uterus, and if the head presents, that the back is to the left. This in itself is not of course a diagnostic, but must be observed in connection with the many other signs here given.

Amniotic Fluid and Prolapsus Funis.—The conditions causing prolapsus funis are largely covered in the behavior of the amniotic fluid. Inability of the fetal head to act promptly as a valve at the internal os when the amniotic fluid first escapes allows the cord to enter the vagina in advance of the head in many cases. A contracted inlet or large fetal head may be the primary cause of prolapse, but this, taken in consideration with the amount of amniotic fluid gives us an antepartum foresight that will often serve to prevent the accident.

If there is an excess of amniotic fluid, the head does not often lie in close apposition with the internal os. Such patients as have an excess of fluid should be instructed when labor first begins to lie down, and keep as quiet as possible until the physician arrives.

Then, if there is an overabundance of fluid and the head lies very loosely at the internal os, it may be best when the cervix is dilated about 1 to 2 inches to rupture the amnion between pains and allow enough fluid to *slowly* escape to bring the head more closely against the internal os. This is "interference," but it is also wise guidance in proper hands. Such early rupture of the amnion should never be performed to prevent prolapsus funis in cases of contracted inlet, except for actual replacement. In other words, it should not be done to lessen the amount of amniotic fluid.

"Fetal Head at Inlet or in Quadrant."—In ascertaining the position of the fetal head, press the fingers upon the abdominal wall about an inch above Poupart's ligament on each side, with the two hands separated about 3 inches. If the skin slides readily, place the fingers relatively high up. If it is very tense, place them directly over the points to be searched in the pelvis. Then press the fingers downward, inward and backward in a direction that would lead to the hollow of the sacrum. If the fetal head is at or near the inlet, it will be recognized without much difficulty except in cases of great thickness of the abdominal wall from fat or any excessive denseness of the uterus from hydramnion. The fingers coming in contact with a fetal part can press against it from somewhat opposite sides and ascertain its density. The only part of the body that can give as hard a sense of touch as the head is the back of the sacrum, but that is only a small surface surrounded by the elastic muscles of the breech. Differentiation between the fetal skull and fetal muscle is entirely a matter of practice. If the fingers do not find the fetal head at the outlet, it should be sought for in other parts of the uterus. It is the most distinct and easily recognized part of the fetus, and once found is like a point in the compass to one who has lost his bearings. It is specially differentiated from the breech on account of its density, it being much harder; secondly, by its conformation, it being more distinctly spherical; thirdly, because it rests lower than the breech when at the inlet. When the fingers are pressed into the inlet in breech presentations, nothing but the abdominal walls and cervix come between the fingers of the opposite hands as they are brought together, the breech resting above the fingers. When the head is not at the inlet, it is recognized, in addition to the signs just given, by its flexibility, which is greater than that of the breech. If at the fundus, under palpation it moves freely upon its cervical pivot, whereas the breech moves the entire trunk with it, and both being in a fluid medium, the sense of displacement of amniotic fluid in moving the breech is greater than that of moving the head. By placing one hand lower down on the fetus this difference in the movement of the trunk can further be recognized. *Tapotement* frequently helps us more than palpation in such irregular positions of the head. The density of the head is recognized as the finger strikes it, and now and then *ballottement* is obtained. The head diving into the amniotic fluid by the stroke, returns and gently strikes the inner wall of the uterus, the stroke being felt by the finger held in place. The head is classed as "in the inlet" when it rests, so to speak, in the "pocket" of the inlet. It may have some considerable mobility, and can perhaps be readily lifted by the finger in the vagina, but it is using the rim of the pelvis as a resting place, as a marble might rest on a finger ring, whereas when the head is at the inlet but not in it, it is either floating or impinging on the promontory and symphysis. While this may represent simply the suggestion of non-adjustment as against tne final descent of the head that takes place in the latter part of pregnancy, it also is of value in calling attention to the question of its probable bearing in labor. If the woman is believed to be at full term and the head is not well adjusted to the inlet but moves very freely above it, there is more or less liability with the precipitation of labor to a shoulder presentation; or there is possibly a want of harmony in the diameters of the head and pelvis; in other words, it is one of the indications at times of large head or contracted pelvis. This question can frequently be settled at the time by gently pressing the head into the inlet (Mueller's test) and deciding that there is sufficient room for the head to become impacted.

"**Fetal Body: Movable, Fixed.**"—When the fetus is small, and the amount of amniotic fluid relatively abundant, as in the sixth and seventh months of pregnancy, there is no established position in which the body may lie. Today it may be a head presentation, tomorrow a breech, and the next day changed again. But as the body grows, and slowly takes up more and more of the intra-uterine space, it becomes less free to move about, gradually works into that position which causes the least cramping, usually the "first position" L.O.A., and is usually compelled to remain in such attitude until delivered. It is then "fixed." It is easy for us to say that it is liable to change its position when we examine the abdomen at the seventh month. It is easy in fact to turn it into various positions at such a time. In such condition we would say that it is "movable."

When, therefore, it is approaching the condition in which it will become "fixed," and we find the position to be a bad one, such as a breech, we are called upon to prevent this by external version. If we find, in the beginning of the ninth month, the body becoming "fixed" in the breech position, it may be well to turn it while that can be done easily, endeavoring to sustain it in the position to which we turn it, and thereby avoid the evils of malposition. We will make mistakes in prognosis, we will even find the body lying in the breech presentation, and too firmly fixed to allow an external version, and then be surprised at labor a fortnight later, when we fully expected a breech labor, to find that the body has been changed to a normal head presentation. Or we may feel satisfied that a head presentation is assured, on examination shortly before labor, and be met with a case of breech, or other presentation. These are the perplexing exceptions that "give us pause," but should not alter our methods. We will save many a patient from the evils of malpositions.

To determine the question whether the fetal body is "movable" or "fixed," we estimate by palpation the mobility of the fetal body, and the amount of amniotic fluid in which it can play. In fact we apply a tentative trial of external version. This does not call for any effort that even causes the mother discomfort.

"**Highest Point Reached by Body in Right, Left, or Middle of Fundus.**"—In head presentations, as has already been mentioned, the body of the child usually lies obliquely across the uterus, running from the left lower to the right upper, or right lower to left upper, which is the case in anterior occipital presentations, or it lies curled along the lateral zone of the uterus, as in occiput to the right or left transverse. When it lies obliquely, the fetal body is apt to reach higher in the fundus on the side opposite to that at which the occiput presents. Thus in a L.O.A. the breech will be mainly to the right of the abdomen in the upper quadrant, and reach its highest point, or that nearest the maternal diaphragm on the right side. In the other position, where the body curls around the lateral zone, the breech is more apt to reach the fundus on the side in which the back lies; as in left occiput transverse, the breech will be in the left upper quadrant, close to the middle abdominal line of the mother. There are many exceptions to this rule. Studying it increases our knowledge of the characteristics of attitude of babies in-utero.

"Back Lies to Right, Left; Anterior-Lateral Position."—In determining the position of the back, both hands must be employed, aiming in a general way to outline the body of the fetus, and particularly to differentiate between the trunk and extremities. This differentiation is the clearest and most efficient sign we have. When the occiput and, we may say, the spinal column lie well forward, and more or less near the median line, the extremities lie well posterior or at the antipode. The general rule, therefore, may be stated that the nearer the presentation is to an occiput anterior, the less likelihood is there of feeling the extremities, and the reverse is equally true. Thus in occiput to the right or left posterior, the child lying upon its right side when the mother is recumbent on the back, the extremities in almost all cases are readily found in the neighborhood of the umbilicus on the opposite side to that of the back, or in the upper lateral quadrant of the uterus. The back itself is much more easily outlined by palpation than the breech—a point that is not in harmony with most teaching on abdominal palpation. In a sense its characteristics are negative. It is a long cylindrical body, having practically no irregularities of conformation, and it is this very absence of irregularity in conformation that aids us to make the diagnosis —together with the localization of the extremities. It must be said here that many signs present themselves that are obtained only by practice, and that it is almost impossible to describe them in writing. As has been well said, those who most appreciate the value of ante-partum examination of the abdomen are those who have practiced it the most, and the writer can safely assert that his appreciation grows with years. As we learn to recognize men and to read their characters by the impressions received from their features, simple signs that we could not point out to another, so we learn by practice that in a great number of patients examined, a certain individuality of form is present in different cases. Certain attitudes are quickly recognized as characteristic of certain fetal presentations. While they merge into pretty much any or all attitudes, yet they are almost capable of classification as types. There is a normal L.O.A. attitude of the fetus in a primipara—left anterior oblique, the head moderately in the inlet, and the back running up obliquely to the right upper fundus, its flexion at the breech being relatively slight, that is the back is well extended. Then we have the characteristic attitude in which the back follows the uterine curve in its lateral zone, lying somewhat in the shape of a ring. In this class there is much more convexity to the back than in the first one. And so a great number of other typical attitudes might be mentioned, but they are left out in order not to confuse. Another aid to diagnosis of the position of the back is the symptom given above, i.e., the part most occupied by amniotic fluid. The back is apt to be in the opposite side; therefore in an occiput to the left transverse, there will be in the right hemisphere considerable space where the fingers can be deeply placed, which is occupied by amniotic fluid, this condition not existing upon the other side.

"Extremities Felt in Right, Left Half Uterus; Upper, Lower Quadrant; Near Anterior, Lateral, Posterior Line." —Palpation of the extremities is one of the most useful means of determining the direction of the occiput and back—in fact is the most available means of diagnosis of all. The back is often an indistinguishable body, lacking irregularity of outline; the head offers the same difficulty; the fetal heart may be heard with equal intensity over too wide an area to help us, while, on the other hand, the extremities are of such small and variable outline, irregularity, and movement, that they are easily recognizable if within reach. If we wish to apply the forceps, it is essential to be absolutely certain whether the occiput lies to the right or left.

The extremities give us a certain diagnosis when other points in palpation are open to doubt. In proportion as the position is one with the back anterior will the extremities be hard to map out, and *vice versa*. They will generally be found most easily in the upper quadrant and well to one side. The fetus in head presentations lies in one of six positions—with its back, or, better, the spinal column, in the front right or left oblique; in the lateral right or left; or posterior oblique right or left. It is seldom found directly in an anterior or posterior position. It is desirable, for the purpose of being on the lookout for rotation of the occiput posteriorly, and especially in forceps delivery to guard against causing such rotation, to know to just which one of these six positions the case in hand belongs.

If it is a case of back anterior oblique, right or left, the middle of the intra-scapular space or dorsal spines will be about 2 inches to the right or left, as the case may be, of the linea abdominalis. The spinal column may, and probably will, run up the maternal abdomen not parallel with the linea abdominalis, but will cross it half way up, bringing the fetal sacrum to the opposite side at the fundus. This position is most frequently found in primipara. Such a position will naturally throw the extremities well under the back, and close to the spinal column of the mother. They may, therefore, not be felt at all, which absence is in itself a help in diagnosis.

But if felt, it will be on the opposite side to that in which the occiput rests. Thus in an occiput to the left oblique anterior, the right leg may be felt in the right upper region, and possibly the right arm may be felt to the right and below the umbilicus.

In a case of occiput to the directly lateral point, the child lies upon its side when the mother is upon her back. This brings the extremities nearer the front on the opposite side. It also gives in some cases a crescentic outline to the fetus in the immediate neighborhood of the umbilicus, and the abdomen, being relatively thin at this part, makes it easier to feel the outlines of the fetus. With the exception of cases with severe distention of the uterus with amniotic fluid, or of very thick abdominal walls, it is easy to recognize the arms and limbs of the fetus along the side of the uterus.

In cases of occiput posterior oblique the extremities are brought still nearer the front and will be close to the linea abdominalis.

"**Occiput Right, Left, Anterior, Transverse, Posterior.**"—This is, of course, an important diagnosis. Pinard has stated that the fingers, in examining the head at the inlet, will pass lowest on the side toward which the occiput rests. This would seem natural in considering the conformation of the child's head and jaw, the fingers pressing upon the occiput will pass down to the occipital protuberance, while those upon the jaw will be arrested at the ramus. The sign has not been as clear and satisfactory to the writer as might be wished, but is of some value. The lateral boundary of the head will extend further on the side occupied by the face than it will on the other side. In the majority of cases the general position of the back and the extremities will give the direction of the occiput, as the head seldom lies twisted in its relation to the trunk. Further means of diagnosis at this point are yet to be mentioned, such as the position of the heart, the sutures, fontanelles, etc.

Rotation of the occiput posteriorly is a very undesirable "accident" in labor. In the ordinary course of events a head that starts with the occiput anterior will very rarely rotate posteriorly, and the majority of cases of occiput to the left and right transverse will rotate under the symphysis, but it is the number that go wrong which we wish to control, and it can safely be said that abdominal palpation gives warning of the occurrence of posterior rotation. If the fetus lies with the extremities prominent near the anterior abdominal wall, while it may only be a transverse presentation of the occiput, it is that much nearer the possibility of posterior rotation, and if the extremities lie nearer the median line and the back is obscurely felt, then we have an actual case of posterior presentation. It is a simple matter to prevent delivery with the occiput posterior if the condition is recognized before rupture of the amnion, or impaction of the head. It is true that many cases which are posterior in the first stage will rotate forward when the parietal eminences impinge upon the sacro-sciatic ligament. It is also true that the probabilities of rectifying the position of the occiput are greater in cases where it would be most serious if it did not rotate forward, that is, where there is a very close fit between the head and the pelvic canal; and it is consequently true that the most frequent cause of posterior rotation is that of a very small head which can be delivered in any position readily. Not much can be accomplished by undertaking to rotate the shoulders in palpation; thus in an occiput to the left posterior the child's right shoulder will lie a little to the left of the median line and can be pushed over to the right, but this will not affect the head, as the body will simply twist on itself at the neck. In good hands it is perfectly simple and easy toward the end of the first stage of labor to introduce the hand posterior to the occiput and with the other pressing the opposite side of the head above the pubes, rotate the occiput forward enough to cause it in descending to come under the pubic arch; or, if the hand cannot do this, very gentle use of the forceps will suffice to properly establish the position desired. We must add here the very great value in forceps applications of knowing the direction of the occiput. The writer has long taught, with great confidence in the opinion, that the forceps should never be applied until the operator knows exactly which way the occiput lies, and that if he cannot determine this by palpation alone he should introduce the hand into the uterus high enough to make the diagnosis accurately, which can be done generally without risk worth mentioning, as it is only necessary to reach an eye, an ear, or the nose, to determine the direction of the occiput, believing that it is a much lesser evil of the two to so introduce the hand, than to apply the forceps empirically. The normal mechanism of labor always aims at rotating the occiput under the pubes. Forceps applied interfere with that mechanism, are liable to prevent rotation, and also are liable to force the wrong rotation. Consequently it is the author's rule to so apply the blades, deviating from the median line of the pelvis, that when traction is made the blades will be brought in a curve toward the median line and bring with them the occiput under the symphysis. Absolutely no additional danger accrues to the mother from this procedure, if properly done, and proper rotation of the occiput is thereby insured.

"**Head not Pocketed in Inlet.**"—This is an interesting and important question for settlement, as it bears upon that urgent query: How readily will the head pass through the pelvic canal? We may classify the relation of the fetal head to the pelvic inlet into three divisions: first, that in which it hangs, or rather floats freely just above the inlet; second, that in which it rests like a billiard ball in a napkin ring, more or less lightly in the brim of the pelvis, and third, where it is "engaged," as in actual labor.

The latter phrase, i.e., "engaged," is somewhat arbitrary, being understood to mean a sufficient entrance of the presenting part of the fetal head within the pelvic inlet to permit either of descent or moulding in consequence of labor pains. We may find the head as low in the ante-partum condition in some cases as it is when "engaged" in others after labor has begun. But we do not call it that of the head being "engaged." We use the term "pocketed" in the sense that the head, previous to the inception of labor, rests more deeply in the inlet. It is not pocketed when it can be moved freely about above the inlet. Thus, in a case of contracted conjugata vera, we never find the head pocketed in the inlet before labor. It may rest upon the promontory and symphysis, but is in no way within the grasp of the ring of the pelvic entrance. It can be moved over to the iliac fossa without pressing the fingers upwards against it through the vagina.

In this latter attitude in the earlier stages of pregnancy it is generally floating lightly at the inlet, but not within it.

The diagnosis is to be made by abdominal palpation, to be afterwards confirmed or not by the vaginal examination. It is ordinarily not difficult to determine the question.

"Displaceable, Established."—Literally interpreted, it might be said that all fetal heads presenting in the ante-partum period are displaceable, but not within the meaning of this question. Can the head be displaced if we find it desirable? And, what is more to the point, will it probably remain where it is until labor, or will the presentation change? If on examination at eight months' pregnancy we find the occiput presenting in the first position, may we reasonably expect to find it presenting in that position when labor occurs?

As a rule, yes, though we may err in cases where we least expect a change. The signs that the head is displaceable or established are: "Displaceable" when there is sufficient pelvic contraction to prevent the head from resting in the pocket of the inlet, when the amniotic fluid is abundant and the pelvic basin is roomy, when the abdominal wall is flaccid, or pendulous. It is "Established" when the head rests well within the pelvic inlet and fits snugly, with a scarcity of amniotic fluid in the uterus, and little or no room for movement of the fetal body, with firm support on the part of the abdominal wall.

The question involved cannot be completely answered until we make a vaginal examination, when the mobility of the head may be determined by making counter pressure against it bi-manually.

So long as there is doubt as to the establishment of the head, the patient should be under ante-partum surveillance, est a malposition present at labor.

"Cervico-Occipital Curve, Acute, Medium, Obtuse." —This refers to the angle of the neck and aims to determine the question of extension of the occiput or chin. In extension of the occiput, the curve runs from the occipital protuberance to the seventh cervical at a very obtuse angle; while in extension of the chin, the occiput being flexed backward, the curve becomes very acute, making in fact a deep sulcus. Previous the descent of the occiput, the head lies, practically in all cases, in the median position, the curve of the neck being much more marked than in extension of the occiput and less marked than in extension of the chin. Pass the fingers over the head along the neck to the shoulders. The head and shoulders can generally be outlined and the curve that is felt between gives the curve of the neck. Further, in cases of extension of the chin, in face presentations, more especially with the chin posterior, the entire occiput is high up behind the pubes and is found much more prominent than in extension of the occiput. This sign is most easily recognized in that most serious condition--extension of the chin, and is therefore of most value when most easily recognized. It is in the recognition of malpositions, either before labor or early in the first stage, that we get our best results in their treatment. Some malpositions are difficult to correct before the second stage of labor is well advanced. It is true that many malpositions, prominent being the one just discussed—face presentations—do not become such until the amnion ruptures and descent occurs, but the value of prophylaxis is not lessened in those cases in which it may be employed because there are many in which it cannot be utilized. The author has had several cases of face presentation that declared themselves before rupture of the amnion and that were easily corrected as a result of being recognized early. In cases of chin extension one hand may make upward pressure against the chin in the vagina through the uterus and the other press the occiput down from above the pubes and hold it there until it becomes impacted, or he may introduce the hand into the cervix, rupture the amnion and grasp the occiput with the hand, introducing the right hand where the occiput is to the left and *vice versa.* Where the occiput will not remain in position, slight traction with the forceps or prolonged pressure over the pubes on the occiput may be employed. The use of forceps is the safer and more convenient method.

"**Head Level in Pelvic Brim High, Medium, Low.**" —In palpating the head at the inlet marked differences will be found in the plane it occupies. Thus in roomy pelves the head may lie fully one-half below the brim all through the last month, or in contracted pelves it may be held so high by the promontory and symphysis that none of it is below the level of the brim. The fingers can estimate the amount of head that lies above the brim. This same point is referred to in the vaginal examination. In interpreting the meaning of these differences, it can be said that when the head is low in the inlet the patient is not necessarily near her confinement, but that unless the head will yet grow to an extent that may lift it up out of the inlet, the labor will be simple and easy in so far as pelvic dimensions are concerned. In cases of high elevation of the head we cannot assume that the attitude is due to ordinary tonicity and placing of the uterus and to excess of amniotic fluid that widens out the infundibular lower segment of the uterus in some cases; but we should, whenever finding such an elevation of the head, and particularly where it does not under pressure enter the inlet, determine the question of possible pelvic contraction as a cause. The head will be found fixed when low in the inlet, and freely movable when high.

"**Head Large, Medium, Small.**"—This term refers to the dimensions of the fetal head, relative to those of the maternal pelvis. By a *large* head, therefore, we mean one that in a particular case will not be delivered without more or less moulding, and perhaps great difficulty; by *medium*, one that enters the inlet readily, and that will be delivered with moderate difficulty only; and by *small*, one that is sensibly under size, such as occurs in premature deliveries, where any question relative to the mechanism of head deliveries scarcely arises at all. The determination of the size of the head requires, first, a consideration of the period of pregnancy. If this is previous to the ninth month, in the majority of cases the calculation will be productive of comparatively little utility. The growth of the fetal head, and the consequent increase in its diameters from month to month is shown in the following table :

FETAL HEAD DIAMETERS

AGE FETUS	BI-PARIETAL		SUB-OCCIPITO-BREGMATIC	
	CM.	INCHES	CM.	INCHES
28 Weeks	6.7	2.65	6.9	2.75
32 "	7.5	2.96	7.7	3.10
36 "	8.4	3.30	8.7	3.55
40 "	9.45	3.75	9.8	3.90

In estimating the dimensions of the head, we must rely upon our fingers. There are instruments of more or less utility for directly measuring the diameter of the fetal head, but these, of course, can only be used in labor. The determination of head dimensions by the fingers is to be made: first, by pressing the fingers of both hands at as nearly opposite points of the fetal head at the inlet as possible, making gentle alternate pressure with the two hands, and then making allowance for the thickness of the abdominal and uterine walls, and considering what are the points of impingement, and therefore what are the diameters between the fingers. This examination does not aim at actual measurements, but it does give a general estimate of the size of the head. A further point to be observed is the entrance of the head into the pocket of the inlet. With the finger still in the position just cited, we can press the head gently into the inlet, and practice will tell us much as to its probable ease of entrance. The more accurate manipulation is known as Müeller's test. It requires that the fingers of one hand shall be introduced into the vagina, and pressed up against the fetal head through the anterior wall of the vagina and cervix, while the fingers on the other hand make pressure above the pubes. The head can then be lifted and depressed, and more or less knowledge gained as to its ease of entrance into the inlet. Elements that may cause error in the test are the space occupied by the soft tissues of the lower portion of the uterus, and the possible question of proper adjustment of the head in its usual attitude when entering the inlet, that is, the extension of the occiput which brings the sub-occipito-bregmatic and inter-parietal diameters forward. Before labor, the occipito-frontal diameter is to some extent the one involved in the attitude in which the head rests. In making pressure downward, therefore, we must aim to make pressure in the neighborhood of the occipital protuberance. It will readily be seen that the degree of accuracy obtained on this point of head dimensions would be in proportion to the experienced hand and skill of the examiner. In the class of cases in which this question is most important, namely, contracted pelves, the indications are distinct, and the diagnosis easy in proportion to the gravity of the case. If the conjugata vera is much contracted, and the fetal head developed, as in the last pregnancy, we will find upon examination: first, that the head moves very freely at the inlet, does not rest low down, as will be further shown in a point brought out under "vaginal examination," and does not give the sense of resting in a ring, but strikes the promontory and pubic bones, and then comes to an immediate stop. In reverse conditions, the head gradually stops descending into the pelvis under pressure, as it enters in the form of a wedge which gradually gets tighter. The difference, therefore, in its behavior in cases of normal dimensions and contraction is marked, and can be readily ascertained by the fingers. It should be here stated that when these symptoms of contracted pelvis, or large head, are recognized, the conclusion must not be absolute that a very difficult labor will result, as some cases will give all these signs, and yet re-adjustment of the position of the head in the first stage of labor accomplishes delivery, even without assistance. In other words the question of inducing labor should be approached with great caution, and a decision in regard to special operations should be made only after the conditions of the first stage have had an opportunity to declare themselves.

"Fetal Heart Heard in Quadrant."—The sounds of the fetal heart may be heard either by placing the ear directly upon the maternal abdomen over the region near-caused by two little bodies, combined with the former often prevent diagnosis. By gaining knowledge of the two heart sounds, and especially by counting different pulse rates, we obtain a certain diagnosis. The usual rules, or those indicated in the table above, cannot be followed in multiple pregnancies, as the points of greatest intensity may be in quite unusual places. One may be near the umbilicus, and the other several inches above it and far to one side.

III. Determination of fetal vitality by fetal heart auscultation is of considerable use, though fraught with difficulties. The only means we have of estimating fetal vitality are: The heart sounds, fetal movements or activity, and rate of maternal abdominal expansion. The fetal pulse bears much the same relation to the health of the little one as does the pulse of the adult to the latter's condition. In acute fevers in pregnant women, the fetal heart beats more rapidly during the high temperature in the maternal blood. It will be at first strong, full and fast, running at the rate of 160 or more a minute. In the exhaustion stage it will beat as fast, but much more faintly, and shortly before intra-uterine death the pulse rate will fall to 80.

In cases of mal-nutrition, such as syphilis, chlorosis, anemia and hemorrhage occurring in the mother, the fetal heart will rate faster than normal, ranging from 135 to 160 a minute, and contract with less force than in a healthy state.

The value of periodic ausculations of the fetal heart in such cases as those of marked albuminuria, particularly where the patient is upon a limited diet, habitual premature death of the fetus, etc., becomes at once apparent.

In the diet cases of albuminuria it often becomes a feat in medicinal balancing to reduce the diet to milk, and not kill the fetus, and where the death of the fetus is foreseen, some modification of the maternal diet can at times be allowed.

IV. Diagnosis of fetal weight and sex by heart auscultation is of scientic interest, if possible, and of general popular interest, whether true or not.

While there is a slight foundation for the popular belief that the male child has a slower pulse than the female, the former more usually rating under 135 a minute, and the latter over that number, yet the percentage is very slight, and in practical work of no value whatever. A better probability diagnosis of sex may be based upon the relative preponderance of boys or girls in the families of the parents. Nor are we any better off in endeavoring to diagnosticate fetal weight by the pulse rate. It would naturally be supposed that the pulse would be somewhat faster in a small fetus and slower in a large one, but this is not the case to any appreciable extent, as the writer has carefully determined in a long series of cases. We have found many cases of fetal weight of six and less pounds, with the pulse under the average, and *vice versa*, of rapid pulse with the fetal weight from eight pounds up to ten or more.

"**Location of the Placenta.**"—It is rarely that the placenta can be recognized and its site outlined in the antepartum examination. We have as means of diagnosis direct palpation—as in placenta previa centralis—when the external and internal orifices of the cervix are patulous, variations in abdominal and uterine contour, increase in vascular sounds and direction of the fallopian tubes. We may be further aided by probabilities, such as that most placentæ are attached to the upper posterior portion of the uterus, but we cannot make a diagnosis based on this fact.

We know from our experience in vaginal palpation of the cervix and lower segment of the uterus, that the presence of the placenta causes an increased thickening, softening, and vascularity of the uterus. It is therefore a reasonable inference that the same variations in the uterine wall occur where the placenta is attached higher and nearer the fundus, though not to the same extent, as nature has constructed the upper uterine wall, so to speak, with the expectation of feeding the placenta, which is not true of the placenta previa zone. We have also found the above to be true through Cæsarean section, post mortem examinations, and rectal palpation. But outside of cases of placenta previa and attachments of the placenta anteriorly and below the fundus, except in cases with very thin abdominal and uterine walls, we cannot locate the placenta by palpation.

G. Leopold (*Centralblatt für Gynäkol.*, No. xii., 1895) observed as the result of a number of Cæsarean sections, where the uterus was brought to view, that the Fallopian tubes converged posteriorly when the placenta was attached to the anterior wall of the uterus, and converged forward and upward in posteriorly situated placentæ. The tubes ran more posteriorly to the perpendicular line when the placenta was attached anteriorly than they did anteriorly when the placenta was attached posteriorly. There can be no question as to the correctness of these observations, as they were made by so reliable and experienced an obstetrician as Leopold. The explanation of these variations is, no doubt, due to the increased expansion of the uterine wall on the side of placental attachment compared to the opposite wall. It would therefore be reasonable to assume (as Davis has claimed in his text-book) that marked alterations in the shape of the uterus result from placental attachments at the cornua, which may cause the uterus to have a decided bulging at this region. To what extent the variations given by Leopold can be recognized in palpation through the abdominal wall we are unable to state. We have been unable ourselves to recognize such variations in this manner.

We have had cases where there was a perceptible bulging of the abdomen in the region below the umbilicus, with increased thickening of the inter-fetal walls, with less firmness of the tissues, giving a "boggy" sense to the fingers, where the diagnosis was made of the attachment of the placenta at that region, such diagnosis being afterwards confirmed in delivery by direct palpation in the uterine cavity. To diagnosticate placental location by palpation we should remember that it is not cystic—that it is inelastic, or boggy, or mushy—that it is not unlike fat tissue in an old abdomen which has been through the wear and tear of many labors and that the usual firmness and elasticity of muscle are diminished by having the placenta lying under it.

A feeling of uncertainty will generally attach to our diagnosis in such cases. The author found it so in two cases of extra-uterine pregnancy advanced to seven and nine months respectively, where the placenta was of good size in each and lying *over* and *outside* the uterus and left Fallopian tube, and *next to* the abdominal wall.

Palpation by the rectum can be secured in suspected placenta previa partialis, or separation at the normal site where hemorrhage is occurring. To locate the placenta in such cases, by forcing the hand into the rectum, is more objectionable than treatment for the hemorrhage without knowing the location of the placenta.

In former days, when it was believed that the maternal blood poured through the placenta and cord to the fetus and back to the mother, it was natural to believe that the whirring sound heard over the uterus at certain places was the placental murmur or "bruit." But when we consider that only a slow capillary current courses the villi of the placenta on the fetal side, we would almost as soon expect to hear a murmur in the skin as in the placenta.

That such a murmur may exist over the placenta is understood, but it is from the sinuses of the uterus. There is an increase in the uterine circulation murmur over the region of the placenta, but we have found such locally intensified murmurs in cases where it was proved in delivery that the placenta attached elsewhere. This uterine souffle is not therefore a safe guide to placental location. This murmur is sometimes due to adhesions which more or less twist or constrict the uterine or ovarian arteries.

The relative frequency of location of the placenta has been given recently as follows: Upon the posterior fundal side of the uterus in 50 per cent. of cases; upon the anterior fundal side in 40 per cent.; upon the right side in 6 per cent.; and upon the left side in 4 per cent.

"**Estimated Fetal Weight.**"—Here is a question whose accuracy is capable of great variation. The judgment, of course, will improve with practice. The period of pregnancy must be considered, also the size of the mother, the size of the father, the weight of the previous children at birth and the general outlines of the fetus as determined by the fingers. Babies *in utero* hold a pretty fair ratio to the weight of the parents. There is an increase, according to the rule, in the weight of children in subsequent pregnancies, dependent upon the age of the mother, the smallest children being born when the mother is under twenty years of age, with a progressive increase up to thirty-five, the largest children being the product of the period from thirty to thirty-five years of age, followed by a decrease in weight from this time on. The weight of the child does not depend upon the pelvic measurements, but upon the weight of the mother and father. The weight of the mother counts more than her height. In the classification here employed, "large, medium, small," the actual size of the fetus is not aimed at, but its relative size to that of the pelvis. Consequently, though the fetus may weigh six pounds at term, it might be classed as large, because of the mother being very small. In other words, this classification aims at a practical clinical question bearing on delivery.

"**Estimated Weight at Birth.**"—This classification has room for many inaccuracies. First of all, the period of pregnancy not being definitely known, the length of time for fetal growth by labor time is uncertain; and, secondly, the actual present weight of the fetus not being known, the calculation may be far from right at birth. The author's experience, however, has been fairly good, and really valuable results are obtained by the student.

"**Male, Female.**"—As has just been said, it is not worth while to make a diagnosis of sex by the rate of the fetal pulse. There is more value in following the preponderating sex that may exist in the maternal and paternal histories. Thus, if in the father's family there have been an equal number of males and females in his own family and that of his parents, while in the mother's family there have been five or six females and only one male, and a like female tendency existed in her parent's family, then we would rather expect the patient's child to be a girl.

If Schenk's theory that the presence of sugar in the urine of the mother, particularly in the first months of gestation, fore-tells a female, and its absence a boy, then this question might be determined by early urinary tests.

Conservatively speaking, we have no means of predetermining the sex of the fetus.

CHAPTER IV.

"VAGINAL EXAMINATION."

The Question of Sepsis in Relation to Ante-Partum Examinations.—Inasmuch as a thorough ante-partum examination cannot be made without at least a brief vaginal examination, and while such an examination aims, for one thing, to determine that the vaginal tract is, or is not, aseptic; it becomes our duty to avoid making it septic by our manipulations.

The most generally accepted views of leading investigators on this subject are: First, that the secretions of the vagina are normally aseptic, in so far as pathogenic germs of puerperal infection are concerned; and, Second, that they are even germicidal, and will render a septic vagina aseptic in from nine to twenty hours. Third, that the vulva and introitus vaginæ are not to be relied on as aseptic, nor are they germicidal.

It is not fitting in this work to enter into any detailed account of the work that has been done leading up to these conclusions, other than to make clear the facts now accepted.

The Fallopian tubes, uterine cavity, and the upper half of the cervical canal are entirely sterile, except in cases of infection from without. There is unanimity on the part of investigators on this point.

From the outer cervical os to the vulva there is a decreasing sterility. The mucus plug which usually fills the cervical canal, acts as a barrier against the invasion of the uterus by infectious germs.

It accomplishes this partly by mechanical opposition, and partly by being deficient in albuminoids, the germs starving to death before they can transmigrate to the uterine cavity.

The vaginal secretions, normally sterile, more surely so in the upper uterine end, have the power to destroy infectious germs in from nine to twenty hours.

Antiseptic solutions, douching the vagina, do not certainly render the secretions sterile, but do weaken their germicidal power.

The germicidal power of the vaginal secretions is believed to be due to the abundant secretion of leucocytes, which bring about phagocytosis; to the chemical action of the ptomaines of the normal microbic flora of the vagina, which probably aid in producing the destructive acidity of the secretions; to the unfavorable character of the vaginal anatomical elements; to the pathogenic germ growth, and to the absence of free oxygen in the vagina.

The secretions of the introitus vaginæ, and the surfaces of the vulva, are neither sterile nor germicidal.

These conclusions point in the clearest manner to two practical applications in clinical obstetrics: First, that the entrance to the vagina, during pregnancy, should be cleansed on making digital examinations; and, Second, that the inner portion of the vagina should not be cleansed, i.e., douched.

These conclusions have not in any way altered the accepted view that the examiner, nurse, and instruments are the means of introduction of infectious germs, and should be thoroughly sterilized, if possible, before being brought in contact with the vagina.

Exceptional conditions may prevail in individuals which will call for modified methods. The cervical plug is often wanting in the later weeks of pregnancy, due to the expansion of the cervix under pressure (gravity) of the fetal head. It becomes easier in such cases for pathogenic germs to pass the "always sterile" line, and enter the uterine cavity.

Of the more prominent germs producing puerperal infection, such as the staphylococcus, streptococcus, bacillus coli communis, and gonococcus, the last is the most to be dreaded in the ante-partum period.

The gonococcus, in its character and behavior is exceptional to the other germs, and these are so little understood that we have secured a personal contribution from Dr. J. Whitridge Williams, whose writings on the bacteriology of the genital tract are authoritative, in answer to the following questions:

1. Is the germicidal action of the vaginal secretions upon the gonococcus the same as upon other pathogenic germs ?

2. Does not the gonococcus get beyond the immediate surface of the vagina sufficiently to escape the germicidal action of the secretions ?

3. Does not the gonococcus enter the uterine cavity so frequently during pregnancy (coming from copulation), as to indicate that it either has superior vital resistance to the vaginal secretions, or that it has greater vital endurance while passing through the non-nutritious cervical plug, or that that plug is frequently pervious or absent ?

4. Does the presence of the gonnococcus in the vagina during pregnancy call for any special treatment before labor ?

The substance of the replies to these queries is that:

1. The vaginal secretion has no such effect upon the gonococcus, which appears to thrive in all varieties of secretion. It is the only pyogenic coccus found in vaginal secretions, as has been shown by Krönig, Menge, and Williams.

2. There is no doubt that the gonococcus invades the tissues to some extent, but as the vaginal secretions have no effect upon it, it is a matter of indifference as far as the former is concerned.

3. In the vast majority of cases of gonorrheal puerperal endometritis, the infection does not occur during pregnancy. In many cases there was a chronic cervical gonorrhea before pregnancy, which persisted throughout its duration, and extended up into the uterine cavity. In other cases, the uterine infection does not occur until after labor, when it simply extends from the vagina.

4. As the presence of gonococci in the vaginal secretions of pregnant women is usually due to an infection of the cervical canal, treatment directed toward the vaginal genorrhea is largely useless, while the cervical canal cannot be thoroughly disinfected during pregnancy without marked danger of causing its interruption.

Inasmuch as we have in the gonococcus a germ with which we cannot cope during pregnancy, which resists all est the former, or with the stethoscope applied in like manner. The phonendoscope, an instrument which we had hoped would increase our hearing ability in this direction, and which has proved quite useful in other directions, has not done so in fetal heart auscultation.

The results sought in listening to the fetal heart are in the order of their importance before labor: first, location of the heart, and consequent aid to diagnosis of fetal position; second, diagnosis of multiple pregnancy; third, determination of the fetal vitality, gradual weakening, and premature fetal death; and fourth, diagnosis of fetal weight and sex.

During labor, a most important index of fetal vitality is obtained by hearkening to the pulse.

I. Location of the fetal heart is usually but confirmatory of the diagnosis of fetal position. As it is easy to make a mistake in this respect, not so much as between head, breech or transverse presentations as between a right or left occipital attitude—a differentiation of exceeding importance when the forceps are to be used—it is always a point requiring careful attention.

Its location becomes of major utility, when, by reason of inability to decide the fetal position by palpation, owing to the great thickness of the abdominal wall, or a tumor, or twins, we find it our sole reliance for diagnosis outside of a vaginal examination.

In recognizing the fetal heart, we must exclude the rythmical murmurs of the aorta, uterine and ovarian arteries, and the uterine souffle. Differentiation from the maternal arteries, and the uterine souffle is obtained by taking the maternal pulse simultaneously. The maternal and fetal pulses are practically never simultaneous, and the latter is almost invariably more than double the frequency of the former.

The writer has had one case, in many thousand auscultations, in which the fetal pulse previous to labor some weeks was eighty a minute. The pulse of this fetus soon after became normal at 134.

During labor the fetal pulse not infrequently slows to 80 a minute, a warning of approaching death of the fetus.

In a case of head presentation the fetal pulse will be heard most plainly when the position of the fetus is a R.O.A., as the fetal heart is here brought nearest the maternal abdominal wall.

Its point of greatest intensity will usually be about 1 inch below the umbilicus and to the right of the linea abdominalis.

The following table, compiled from 2,000 cases recorded in my hospital books, summarize the average localities of greatest intensity of fetal heart sounds in different positions:

TABLE OF POINTS OF GREATEST INTENSITY OF FETAL HEART SOUNDS IN DIFFERENT POSITIONS.

Fetal Position.	Direction and Distance from Umbilicus.							
	Right of.		Left of.		Above.		Below.	
	Cm.	In.	Cm.	In.	Cm.	In.	Cm.	In.
L.O.A.			7.5	3			3.9	1½
L.O.P.			9.5	3¾			3.9	1½
R.O.A.	2.5	1					3.9	1½
R.O.P.	4.4	1¾					3.9	1½
L.S.A.	0.5	¼			3.9	1½		
L.S.P.			2.5	1	4.4	1¾		
R.S.A.	6.3	2½			3.9	1½		
R.S.P.			.5	¾	4.4	1¾		
L.Sc.A.			.5	¼			6.3	2½
L.Sc.P.	medium.		medium.				6.8	2¾
R.Sc.A.			1.3	½			4.4	1¾
R.Sc.P.	1.3	½					7.5	3

Failure to hear the fetal heart is not infrequently met with. It may lie too near the posterior maternal wall, the maternal abdominal wall may be too thick, the heart action may be too gentle, or the sounds produced by the maternal vessels may obtund those of the fetal heart. Much amniotic fluid intervening between the fetus and abdominal wall deadens the heart sounds. In hydramnion the fetal heart may be best heard with the patient in the knee-chest position.

The differentiation of head from breech presentation by the localization of the fetal heart is seldom required, and would be subject to much uncertainty if it should be. It is of more value for differentiating between right and left positions.

II. For the diagnosis of multiple pregnancy, fetal heart auscultation is the best means we possess for a sure diagnosis. Many cases of twin pregnancy are very difficult to determine by palpation, as the many failures shown on our hospital books emphasize. Some of these failures are due to careless examination, the examiner resting satisfied with the localization of one fetus.

But twin pregnancies usually are accompanied with an excess of amniotic fluid, and the multiplicity of outlines

2. Scrub the hands and forearms up to the elbows vigorously with nail-brush, green soap, and hot water, for at least five minutes by the clock, or until they are microscopically clean, paying special attention to the nails and palmer surface of the fingers. The water must be changed at least once. After changing it, remove dirt from beneath the nails with a nail cleaner, or pen-knife, and then renew the washing.

3. Rinse the hands in fresh water, soak them in a hot, saturated solution of potassium permangate until they take on a deep mahogony brown color.

4. Dissolve this off in a hot, saturated solution of oxalic acid.

5. Then soak the hands and forearms in a 1:1000 bichloride solution for three minutes by the clock.

This method is quite too severe upon the physician's hands, even in labor work, and unnecessary altogether in ante-partum work, but it is given as the most efficient method, and can pose as the ideal.

The effort to obtain rapid sterilization by soaking the hands in alcohol is useful, as it renders the undestroyed germs less likely to leave the hands, but it is not a reliable sterilization.

We would recommend for ante-partum examination work the employment of clauses "1" and "2" in Halsted's method just given, to be followed by similar scrubbing, instead of soaking with bichloride solution 1:2000. Then, inasmuch as the mucus, having been washed from the vulva, will leave it sticky, dip the examining fingers in a 5 per cent. solution of lysol. This will act as an unguent, and will be what unguents generally are not, i.e., aseptic. Unguents to be safely aseptic require admixture with an essential oil, which is apt to burn when brought in contact with the patient's mucous membrane.

Every physician should be accustomed by habit to keeping his cleaned hand from contact with anything, even the sheet, before making the vaginal examination. This last clause covers the cause of more failures in asepsis than all others together.

In introducing the finger within the vagina, we should seek to avoid contact with the hair, and outer labiæ, and endeavor to pass the vulva without carrying these parts with the finger. They may not have been well cleansed. This is best accomplished by first holding open the labia, as shown in Fig. xvii. The old fashioned method of blindly seeking under cover for the ostium vaginæ, with the possibly sterilized fingers traversing the surface of the anal region, or wandering like one seeking for a well in a wheat field, through the pubic hair, conceived in false modesty, and executed in indifference, is as out of date as the old custom of managing the perineum, during delivery of the head, by touch alone.

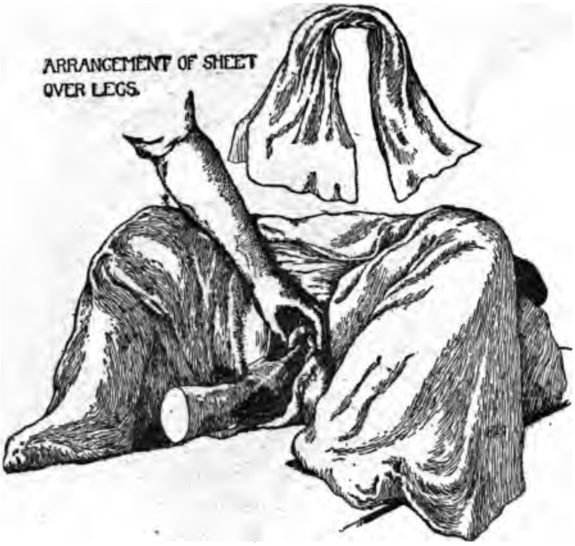


FIG. XVI.

Dorsal Position. Thighs and legs flexed; vaginal exposure of the patient as in the use of the catheter. Partial obliteration of vulval canal by wide separation of labia with fingers of left hand. (After Edgar).

" Vaginal Secretion, Mucous, Leucorrheal (White, Yellow), Gonnorrheal."—The end sought in noting the character of the vaginal secretion, as it appears to the eye, is to make a diagnosis of probability that it is aseptic, or septic. We freely grant that we cannot make a certain diagnosis by douche will greatly lessen the activity of this germ and its catarrh.

When such cases are observed before labor, and the infection destroyed, they constitute a triumph in obstetrical prophylaxis.

Ophthalmia Neonatorum.—Before describing the topic of the "Vaginal Secretions," it becomes logical to take up the subject of ophthalmia neonatorum. This disease, an acute infection of the conjunctiva of the new-born infant's eye, is acquired either during labor or in the nursery after labor. Any of the pyogenic germs may produce ophthalmia, although the serious forms are caused by the gonococcus. It may be acquired during labor, either from unassisted contact with the vaginal secretions or from the physician's hands, or instruments. It is the cause of blindness in from 26 to 36 per cent. of all cases. While Credé's method of prevention, by dropping nitrate of silver in the eyes of all infants immediately after birth, has enormously reduced the number of cases, there is probably not an obstetrician who does not long for some other method than one which requires that all infants shall suffer treatment that the infected may escape. If the maternal cases of infected vaginal secretions could be picked out and cured before labor, or the vagina be rendered even temporarily innocuous during labor, there would be no ophthalmia, and the ideal method of prevention secured. We cannot hope to achieve such results in all cases, and cannot therefore depend solely upon vaginal treatment for prevention. And, unfortunately, this seems most true of the worst offender, the gonococcus. But we can pick out practically all pyogenic cases, and check, or confine, during labor, the infectiousness to such an extent that it becomes our duty to make the effort.

If the patient has never had a catarrhal inflammation of the vagina, and the secretion on examination is neither white nor yellow, but a clear, limpid mucus, her secretions will not infect the eyes of the infant. If the woman has a leucorrhea, and more particularly when it is thick and yellow, a microscopical examination should be made for pus cells. Whenever pus cells are present, a speculum examination should be made, (we are referring to the ante-partum period), to learn if there are any abrasions or ulcerations, or cervical lacerations or erosions. These should be cleansed with nitrate of silver solution. If the catarrh is from the uterus, nothing can be done; if it is from the vagina, a bichloride douche should be given twice daily, and the results carefully noted. In the management of the case in labor, care should be taken by the physician not to press a finger against the eyes of the fetus. It should not be forgotten that pus present may come from the bladder. Should there be an abscess in a Bartholin gland, either before or at the time of labor, it should be opened at once, cleansed, scraped, and packed with iodoform gauze. And constant irrigation with saline solution should be sustained while the fetal head is in the vagina.

"**Pruritis Pudendi.**"—This diseased condition of the vulva is noted here, because its presence is not only pretty sure of being observed, but its presence represents an abnormal, acrid vaginal secretion, and an inflammatory abraded condition of the tissues. Pyogenic germs are very apt to be present. It is a clear signal of danger. The vagina should be douched before and during labor in such cases, and the scratched surfaces touched with nitrate of silver. The infant's eyes should always be treated by Credé's method.

"**Vaginal Mucous Membrane: Normal, Sensitive, Pink, Purple, Varicose.**"—The variations of esthesia of the vagina are due to three distinct conditions: Sexual, causing nymphomaniac hyper-esthesia; inflammatory, catarrhal, a hyper-esthesia due to infection of the mucous membrane; or neural, as in vaginismus, or pruritis; and congestive, from varicose conditions.

These varieties may be severally involved in any one case. They are to be recognized by the touch, the patient shrinking from the pressure of the examining finger; or, in the catarrhal form by excessive sensitiveness to slightly irritating solutions and ointments. The writer used an ointment, composed of olive oil, 95 per cent., and cassia oil, 5 per cent., in many cases, finding that the catarrhal cases were very apt to complain of the burning from the oil.

Sexual hyper-esthesia can be differentiated from genuine pain, although patients often endeavor to conceal the real condition, by simulating sensitiveness from pain.

Varicose conditions do not cause sensitiveness in palpation, but a painful feeling of weight and distension.

The relations of these varieties of esthesia to labor are in the inflammatory catarrhal form a declaration of special liabilty to infection, just as discussed above; in sexual hyper-esthesia of no import; and in varicose conditions to the bearing which this condition has upon gestation and labor, as discussed on page 42.

Mucous Membrane Abraded, Ulcerated.—This heading should be in the "Obstetrical History Chart," and is properly introduced here.

Following the statements made above regarding vaginal infection, we must remember that the presence of abrasions or ulcerations constitute a distinct and exceptional condition from normal laws on vaginal infection. We believe in active treatment when such conditions exist, and such conditions should be therefore carefully sought when we make a vaginal examination. The most usual means of recognition of their presence will be blood found upon the examining finger. The treatment has already been described.

"**Perineum : Normal, Lacerated, Repaired.**"—Under the subject of the perineum we consider the question of passage of the fetal head through the vulva, or outlet of the vagina. Consequently two types, representing extremes, may be cited, bearing upon the behavior of the parts in delivery. One, the normal, in a physiological sense, but possibly abnormal from an obstetrical point of view; the very small outlet, in which the question of head passage, without laceration of the perineum is prominent; and the other, where the perineum has been repaired, and retains so insufficient an elasticity that laceration is probable.

It is very difficult for the most experienced obstetrician to foretell in a patient with an untorn perineum, no matter how small the ostium vaginæ may be, its unavoidable laceration during delivery of the fetus. The extent to which the soft parts will stretch, and finally permit the head to pass without laceration, is one of the nine days wonders to the beginner. So many cases appear in which an episiotomy would seem necessary to avoid perineal laceration, even after much experience, that we feel compelled to lay down the rule, that antepartum efforts at dilatation of the outlet should seldom be employed.

Whatever assistance may be applied had best be rendered during labor. If the perineum has been lacerated by previous labors, and left unrepaired, there is nothing called for on our part. It will rather allow of an easier passage of the head than otherwise.

But we should carefully examine a perineum which has been repaired after laceration, to note the loss of elasticity, and even of tissue, it has incurred; and whether its laceration in the coming labor is unavoidable. Nearly the only class of cases in which laceration is unavoidable under favorable conditions, and in skillful hands, is that of repaired, inelastic perinei.

The prevention of lacerations will be considered under "The History of Labor."

"**Part Fetus Presenting.**"—To determine by the vaginal examination what part of the fetus is presenting, the first and second fingers should be gently pressed against the anterior cervico-vaginal wall, and the body of the fetus palpated. The fetal head lies lower in the pelvis than the breech or shoulder; it is bone hard, larger in circumference than the breech, and has, if the occiput presents, the sutures and frontanelles as diagnostics. Additional certainty that it is the head is gained by placing the disengaged hand upon the part above the pubes. It can then be moved between the fingers of both hands and recognized. If still in doubt, the finger can be slipped within the cervical canal, and still more direct palpation applied.

If the breech presents, it will rest higher than the head usually does, will be smaller in circumference, will be softer on account of the flesh covering it, the sulcus of the buttock can be felt, and the anal orifice recognized, if it is necessary to pass the finger within the cervix.

The shoulder lies relatively high in the pelvis, and has the small outlines natural to the parts.

An arm, or leg, is also small, and has sufficient mobility to make the recognition of its shape easy. The arm is differentiated from the leg by the greater sharpness of the olecranon process, as compared with the patella.

The hand is differentiated from the foot by the well known difference in shape, and particularly in the presence of the heel in foot presentation.

The funis may be recognized where it lies in front of the child's body, by its resemblance to a coiled worm, but more especially by its pulsations.

"Distance Head from Pelvic Floor; High, Medium, Low."—On page 73, under the title of "Head Level in Pelvic Brim High, Medium, Low," is discussed the same diagnostic as that at the head of this paragraph, but from the abdominal, instead of the vaginal side.

The variations in the level occupied by the fetal head in the pelvis are likewise shown in the illustrations in Figures xi., xii., and xiii., on page 47. When the head elevation is "medium," it can be reached by the finger without difficulty, and it will be found to rest more or less firmly in the inlet. The head is to be classed as "high" when, on vaginal examination, we find it can only be reached by making a considerable pressure with the hand against the vulva, when it does not rest in the inlet, but moves freely from side to side upon it. This points to two classes of cases, the one which is in no way abnormal, but simply representing the condition that is often present, previous to a final "settling," which takes place in the last fortnight of pregnancy; the other, cases of contracted pelvis, in which the head does not enter the inlet, but rests high because of the obstruction of the promontory and the pubic bones. The third division, "head low," refers to the class of cases, in which the pelvic dimensions are unusually large, permitting the entire uterus to sag below the normal into the true pelvis, and allowing the head likewise to rest low down. The bearing of these various condition upon the question of the probable character of labor is quite evident, and will be referred to under that heading.

" Enters Inlet : Easily, Difficultly."—With one or two fingers in the vagina pressed against the fetal head, with the lower uterine wall intervening, and the fingers of the other hand grasping the same head from above the pubes, it can be pressed into the inlet and raised. In this way an estimate can be formed of the ease with which the head will engage and pass through the pelvis in labor. It is known as Müller's test. If the pelvis is entirely too small, then the fetal head will come to a quick absolute stop when pressed against the inlet rim. If there is abundant room, it will descend as a soft wedge would enter a mold, stopping gradually, instead of abruptly. Between these extremes we must attain sufficient test to make a prognosis for labor. In many cases we cannot do so. It is a measure generally recognized as of value.

" Cervix Under the Promontory, Midway; Long, Short ; Thick, Thin ; Flat, Closed, Open," etc.—During the last months of pregnancy there are a number of variations in the position, shape and consistency of the cervix which should be observed. These variations are not abnormalities, but suggest points of interest bearing on labor. First as to its position. It usually lies back close to the promontory, as in cases of acute ante-flexion. It moves forward, "midway," on the approach of labor, even when there is no consciousness of uterine pains. It also has a tendency to move nearer the axis of the vagina when it lies low in the pelvis. There are cases in which there is a general sagging of the soft parts, in which the pelvis is roomy, and a condition exists in pregnancy analogous to prolapsus uteri in the non-pregnant state. Labor may be said to be more imminent in this condition than where the cervix lies well up against the promontory. The same distinctions may be made as between a long and short cervix. We are, of course, familiar with the progressive shortening and widening that takes place in the cervix from month to month through the later period of pregnancy, but there is quite an individual variation, independent of the time of pregnancy. The cervix, in some cases, continues long and hard up to the commencement of labor pains, and in other cases becomes short and soft some weeks before labor.

The prognostic bearing of the shape and density of the cervix upon the character of labor is both evident and valuable. When it is short and soft we do not expect a prolonged and relatively painful first stage. In the great majority of cases we will find the long, hard, closed cervix in primipara, and the reverse in multipara. When the cervical canal is too small to admit the finger, it does not prevent our determining its length and density.

In the long, closed cervix there is a mucus plug, secreted by its own glands, which has the important function of preventing the passage of germs to the uterine cavity. (See page 83.) In many cases this plug is wanting, when the cervix is flat and patulous. Such cases should be handled with the most careful aseptic precautions.

When placenta previa is present, the cervix will almost always be short, soft and patulous. This is due to the increased vascularity of this part of the uterus from the presence of the placenta.

The uterine sinuses then open here and carry the great placental blood supply. It is well, when the cervix is short, soft and patulous to pass the finger into the internal os, and learn of the possible presence of the placenta. An early diagnosis of placenta previa vastly improves the prognosis. We have had the pleasure of detecting several such cases in this way, when the abnormal implantation was in no way suspected.

"Lacerated ; Repaired."—Almost every woman who has born a child, has had some laceration of the cervix. The degree should be noted, and the condition likewise. The three prominent points suggested by lacerations are: congestion and its liability to excite miscarriage or premature labor ; the danger of laceration during labor from extension of an existing tear, or where it had been sutured, a relaceration from its inability to dilate, owing to its cicatricial character ; and the pyogenic dangers of an abraded fissural condition. In cases of habitual miscarriage, from a deep and unhealed laceration, it may be best to suture the cervix even during pregnancy. When laceration during labor is more likely, because of an existing tear or cicatrix, we should endeavor to prevent violence of expulsive effort during dilatation in labor.

"Internal Os : Closed, Open."—This question is put here more especially to draw attention to the next one, "Placenta Previa."

Its bearing has just been discussed. There is no more serious danger in pergnancy than placenta previa, and we should follow such a routine of examinations as will be most likely to drag-net this rare abnormality into view.

Axis Uterus: Normal, Ante-Verted, Pendulous."—By this is meant the direction of an imaginary line running through the cervix to the middle of the fundus. There is quite a variation in the angle of this axis to the perpendicular axis of the body of the mother. The normal axis is an angle of about 55° forward. Its most marked deviations are found in the condition of pendulous abdomen. It has an important bearing on our most serious class of cases—contracted pelves. When there is a marked contraction of the conjugata vera the fetal head is prevented from coming down into the inlet, and unless it can assume a transverse position, this causes the entire uterine body to rest higher relatively in the abdominal cavity. If marked relaxation of the abdominal wall ensue, which is the natural tendency, the fundus having pushed as high as the diaphragm and other tissues in that neighborhood will permit, it then falls forward.

Accompanying a short conjugata vera we find an increase in the sacro-lumbar curve, the promontory being made thereby abnormally prominent. This increased curve causes the plane of the pelvic inlet to tip further forward and so favors pendulousness of the abdomen and anteversion of the uterus.

While the pendulous abdomen generally exists in women with contracted pelves, it may be produced by violent labor pains, the fundus pressing the recti-abdominales apart, or there may exist an umbilical or ventral hernia, through which the fundus presses and gradually stretches the skin. In marked cases of pendulous abdomen the uterus may lie inverted when the patient stands, the fundus being actually lower than the cervix. (See Fig. xix.)

If the vagina is elastic, it may so stretch that the cervix will lie above the promontory, and above the reach of the examining finger. If not, there will be an acute flexion at the lower uterine segment, an ante-flexion in pregnancy.

If the pendulousness is due to a giving way of the

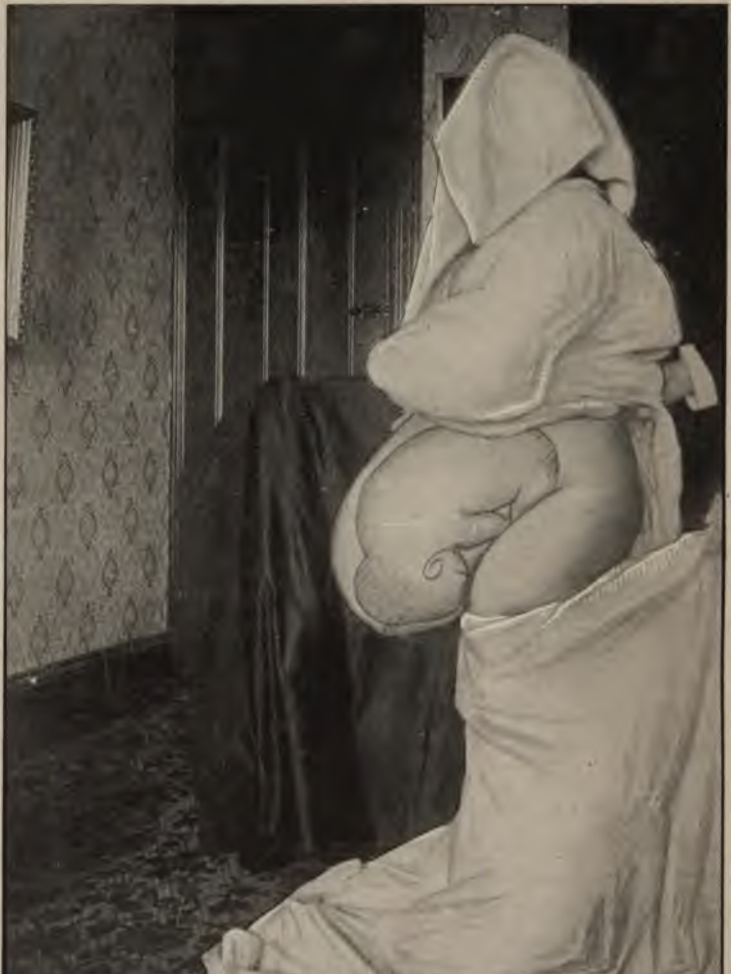


FIG. XIX.

Case of pendulous abdomen with acute anteversion of the pregnant uterus, showing fetal position previous to labor. The umbilicus of mother was 7 inches below the level of the pubes. Fetal head was brought into the inlet by uterine contractions, assisted by physician's hands, when labor supervened. It could not be done before. Effort to do so caused symptoms of maternal heart interference. There was a conjugata vera of 9.2 cm. Patient was a VI-para, all her labors had been laborious, and the children large. Author's case.

abdominal support and the uterus is not crowded, it will usually be easy to return the fundus to its normal position and keep it there by applying an abdominal supporter. If intra-abdominal space is scant, we may not be able to replace the fundus, and important difficulties in the mechanism of labor may follow.

With the fundus lying in front and even below the pubes, any mal-presentation is liable to develop, following uterine pains in labor.

In some cases, it is true, the head will be brought into proper position by the uterine contractions, but we should always be ready to insure either this cephalic presentation, or if not able, a good breech presentation. With the commencement of pains, the fundus should be pressed up toward the ensiform, and such efforts at adjustment made—a form of Wigand's version—as will get the best result.

Inasmuch as the want of support to the uterus may cause an unnecessary amount of amniotic fluid to gradually accumulate, early abdominal support may prove useful.

" Uterine Elevation : High, Medium, Low."—The pregnant uterus varies several inches in its relative height, in the pelvis and abdomen. As an extreme example, it is usually high when the conjugate is very small, and the fetus well developed.

Here the inability of the fetal head to rest in the pocket of the inlet compels it to hold the entire uterus up. In the other extreme, when the pelvic basin is very roomy, the head easily entering it, we may find a condition of what might be termed prolapse of the uterus in pregnancy. If we find the latter condition present in the last fortnight of pregnancy, we know that labor will be accomplished without head moulding, and that there is a liability to precipitate labor. This question bears upon practically the same questions in prognosis found above under the heading of " Head Level in Pelvic Brim : High, Medium, Low," page 73. (Sec also Figs. xi., xii. and xiii., page 47.) In extreme cases of "head high," it will be all the examining finger can do to reach the cervix in the vagina, and in the opposite extreme : "head low", the cervix, or the uterine segment just in front of it, will be within an inch of the *ostium vaginæ.*

We must remember that though we may find the uterus and head close to the vaginal entrance, and so expect a prompt labor without head moulding, the examination being made a few days before expected labor time, the head may rise, and the labor not be as near as we expect, so that with further growth of the head the situation may be entirely changed, and our prognosis of a quick easy labor opposed. But the safe conduct when we find the low presentation is to ask for an early notification of labor's commencement, and promptly respond to the call.

"**Diagonal Conjugate.**"—To measure this diameter, introduce the first and second fingers into the vagina, and reach the promontory with the tip of the second finger. Then press the index finger of the other hand against the symphysis, bringing the tip against the index finger of the hand in the vagina at right angles to it; and then measure the distance from the inner point touched to the tip of the second finger, which was in the vagina. In normal pelves, it is somewhat difficult to reach the promontory with such pressure against the vulva as will not hurt the patient. It may further be added that the more difficult it is to reach the promontory, the less the need of doing so, as in such cases the pelvis in this diameter is sufficiently large for ordinary labors.

Again, when the head is so low in the pelvic canal as to cross the diagonal diameter, and so prevent the finger from reaching the promontory, it is fair to assume that neither this diameter, nor its important neighbor the conjugata vera, will prove an obstruction to labor. In cases where accuracy in measurement is desired, the diagonal conjugate will be understood to vary somewhat according to the position occupied by the patient. It is shortest when the patient is standing, or when the limbs are severely raised upon the abdomen. It is longest when the limbs are allowed to hang dependant from the edge of the table. The latter is known as Walcher's posture. The explanation of this variation lies in the action these different positions of the limbs have upon the last lumbar vertebra and the sacrum. The femur being hinged to the pelvis at the midway point between the symphysis and the sacrum, it acts as a lever upon the sacro-lumbar joint, and by tilting the pelvis up or down tends to straighten the promontory in standing, or in flexion on the thighs, and bends the sacrum back when the limbs hang free and pull by their weight upon the acetabulum. While the latter actually increases the diameter of the diagonal conjugate, the writer does not believe it materially lengthens the conjugata vera, but simply causes the symphysis to swing through a small arc of a circle downwards, bringing the top of the symphysis on a lower plain than before, and, in some cases, allowing the fetal head to stoop under the promontory, so to speak, and thereby enter the middle plain of the pelvis.

"**Conjugata Vera.**"—Thus far, no instruments have been devised that will measure directly the true conjugate diameter. Hirst's pelvimeter is the nearest approach to it. Otherwise we must rely upon the measurements of the external and diagonal conjugata, and the practical test of the fitness of the fetal head at the inlet, a history of previous labors having much weight in cases of multipara. The average allowance for obtaining the true conjugate from the external conjugate is 9.5 cm., (3 ¾ inches.) The actual variations shown in post mortem examinations of pelves, whose external conjugate measurements had been recorded during life, and the calculated diameters of true conjugata, as shown by Michaelis, Litzmann and others (American Text Book Obstetrics. p. 501), were so great that the most we can obtain from external conjugate measurements is, as Hirst has said, to get an indication as to the "probability or the improbability of pelvic contraction. An external conjugate of 16 centimeters (6½ inches), means certainly an antero-posteriorly contracted pelvis; between 16 and 19 centimeters (7½ in.), the pelvic inlet will be contracted in more than half the cases; between 19 and 21.5 centimeters (nearly 8½ in.), there will be but 10 per cent. of contracted pelves; and above 21.5 centimeters, it is almost certain that the conjugate diameter of the pelvic inlet is not contracted at all." In calculating the true conjugate from the external we should consider the individual physical characteristics. The weight in proportion to the height, the amount of adipose tissue, the size of the bones in general, and the degree of lumbar curve are all elements that can be readily observed and applied. The amount to be deducted from the diameter of the diagonal conjugate is from one-half to three-fourths of an inch. The result will, if the measurement is made with care, give a close approximation to the conjugata vera. The elements tending to error are, variations in the thickness of the symphysis, and its height, variations in the plane of the symphysis to the promontory, and uncertainty that the actual promontory was reached by the finger in measuring the diagonal conjugate, the tendency being for the finger to fall a little short of the mark. The statement made above regarding the position of the limbs must also be borne in mind here.

After all the measurements have been taken, we will find ourselves relying to a considerable extent upon the actual test of the ease with which the fetal head will enter the pelvic inlet under pressure. This is known as Müller's test, already mentioned, and is of much practical value.

In cases of ample pelvic dimensions, the head will be felt to partially enter the inlet, and stop gradually, as a wedge would do. Whereas, in contracted conjugata, the head will impinge sharply against two points of obstruction, the promontory and symphysis.

Care must be taken to learn that the occiput is in reasonable position, as otherwise we might think there was a marked obstruction, when it is all due to mal-adjustment of the head at the inlet. The utility of this test is entirely in proportion to the skill and practice of the examiner.

"Thickness of the Symphysis."—The symphysis varies in thickness from one-half to one inch, the average being $\frac{3}{5}$ inch. The diameter may be either measured accurately with Hirst's instrument, or very closely estimated with the thumb and finger.

"Plane of Symphysis In—Out at Upper Border."—Variations in the height, thickness and plane of the symphysis to the axis of the inlet make quite a difference in our ordinary methods of estimating the conjugata vera. At the same time it is very difficult, even for experts, to closely estimate these variations and gain a practical result. As regards the plane of the symphysis, while we may not be able to carefully denote it, by employing Hirst's pelvimeter in measuring the conjugata vera, the practical result will be obtained, as the pelvimeter will give such measurement as allows for the difference in the pubic plane.

To determine that the upper border of the symphysis is "in or out," we should take the external conjugate measurement at not only the usual upper face of the symphysis, but also at the lower face. In other words, we should measure the diagonal external conjugate, as well as the customary external conjugate.

When the upper border of the symphysis is tipped outward, the true and the diagonal conjugates will be approximately equal; whereas, when the upper border is tipped inward, these diameters will vary more than in the normal, the diagonal conjugate will be longer than the vera by more than a half inch.

"**Height of the Symphysis.**"—The average height of the symphysis is four centimeters, or a little more than one and one-half inches.

"**Tip of the Coccyx to Sub-Pubic Arch.**"—In making vaginal examinations before, or early in labor, it is well to carefully observe the dimensions of the outlet and internal transverse diameters.

Cases are not at all rare of pelves giving normal measurements of the iliac crests, spines, trochanters and external conjugate, but with marked contraction at the outlet, giving infundibular form to the pelvis. This was true in two out of five hundred cases in the author's clinic in one year. Symphysiotomy was performed in one case, and Cæsarian section in the other. In the former the true conjugate measured three and three-fourths inches. In both cases the fetal head entered and engaged in the inlet, but could not be delivered through the outlet without an operation. The diameter of the coccyo-pubic space can be measured with accuracy. The average distance from the tip of the coccyx to the summit of the sub-pubic arch is 9 centimeters (3½ inches.) This diameter is increased in labor by the retroflexion of the coccyx to 11 centimeters (4½ inches.)

"**Coccyx: Flexible, Inflexible.**"—With the finger in the vagina, pressure can be made outward against the tip of the coccyx, and the latter's flexibility ascertained. In the delivery of the head through the outlet the tip of the coccyx bends out from one-half to an inch, according to the needs of the case. The diameter of the fetal head that must pass between the tip of the coccyx and the sub-pubic arch is the sub-occipito-bregmatic, the average diameter of which is a little over 9.5 centimeters (3¾ inches.) There must therefore be remainder, with other topics intervening, by reason of the necessity of following the order of investigation most convenient to the patient, appear in the vaginal examination, it becomes desirable at this point to sum up and bring together all the facts obtained bearing upon the fitness of the pelvis for passage of the fetus, and reach a conclusion in its entirety.

We have as data, bearing upon our decision, first, the previous history of labor, if there has been one, and this will give us the ease or difficulty with which a child of given weight was born.

This may, in many cases, be really all that we need to know. If, for instance, where is a history of comparatively easy delivery of a child weighing eight pounds by a mother weighing, say, 130 pounds, no evidence of head molding having been required, it is safe to decide that, no matter what the measurements we obtain, the pelvis is "capacious."

Such assistance will, of course, be wanting in all cases of primipara. To bring together all the questions in this history bearing upon the subject of pelvic dimension will, we believe, render the subject more clear.

These subjects mentioned thus far in this history are:

Character of labor	See page	21
Iliac crests	"	56
Anterior superior spines	"	56
Trochanters	"	56
External conjugate	"	57
Pelvic circumference	"	58
Head not pocketed in the inlet	"	70
Head level in pelvic brim high, medium, low	"	73
Estimated fetal weight	"	81
Estimated fetal weight at birth	"	82
Distance of head from pelvic floor	"	96
Enters inlet easily, difficulty	"	97
Uterine elevation, high, medium, low	"	101
Diagonal conjugate	"	102
Conjugata Vera	"	103
Thickness symphysis	"	104
Plane of symphysis	"	104
Height	"	105
Coccyx to sub-pubic arch	"	105
Coccyx flexible, inflexible	"	105
Angle sub-pubic arch, wide, medium, narrow	"	106
Internal transverse diameter at middle plane	"	106
Inter-ischial diameter	"	107

pubic arch. In taking the measurements of the midway internal transverse diameter, introduce the bulb tips closed, nearly up to the presenting cervix, and spread the tips until they press against the innominate bones laterally. This diameter, as the author has recorded it, has varied in normal cases from 11.4 to 12.6 cm. (4½ to 5 inches).

As these measurements were taken upon living subjects, they include the soft parts intervening between the instrument and the innominate bones. They will give us a much more accurate knowledge of the actual internal transverse diameter at the brim than any others. The instrument ls is of special value in cases of unilaterally contracted pelves. In cases of congenital paralysis of the muscles of one thigh, it may show a shortening of nearly one-half inch in the distance from the middle plane of the pelvis to one side, as compared with the other.

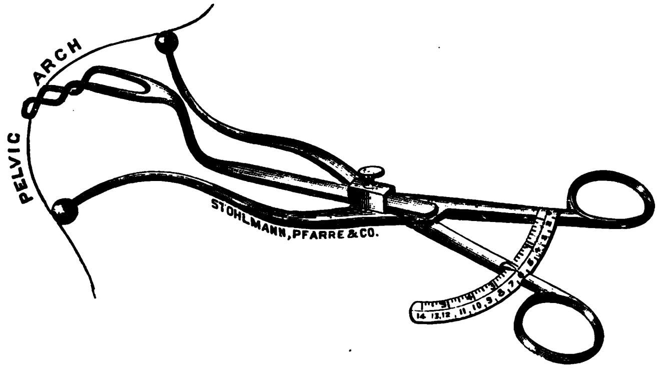


FIG. XX.

Author's pelvimeter, for measuring the width of the sub-pubic arch and the internal middle plane transverse diameter.

"**Inter-Ischial Transverse Diameter.**"—The points of measurement for taking this diameter are the inner sides of the ischial tuberosities. The instrument shown above is used, the difference being simply in the points of application. This diameter should be 11 cm. (4½ inches) in length.

"**Summary of Pelvis: Capacious, Medium, Contracted in. . . . .**" Inasmuch as portions of the pelvic examination have been made in the abdominal examination, and the

CHAPTER V.

URINARY ORGANS.

Bladder Behind, Above Pubes.—The normal position of the bladder during pregnancy is in the space between the upper and lower planes of the pubes, and anterior and below the presenting uterus.

When empty it occupies a triangular space, and when full elongates upward and laterally. It does not rest quite as low, according to the author's measurements made during pregnancy, as is shown by Braun and Barbour, whose investigations were made on post-mortem subjects (see Figs. 21, 22 and 23). Nor does it depend always, as is suggested by their writings, upon dilatation and retraction of the anterior cervix for rising above the pubes. Many cases have been examined in which the bladder rested well above the symphysis during the later weeks and even months of pregnancy. It is in the latter class of cases that the danger of concealed urine retention may develop, through pressure of the fetal head against the urethra after partial emptying of the bladder. The bladder may gradually distend to large dimensions. The author in 1882 drew one and one-half quarts of urine by catheter from a neglected patient during the eighth month of pregnancy, and again in the ninth month.

Cases of bladder adhesion to the anterior body of the uterus, acquired either in non-pregnant conditions, or from severe manipulations in previous labors, or adhesion to the abdominal walls from similar sources, are not infrequently met with. Ventral fixation of the uterus for retro-version or pro-

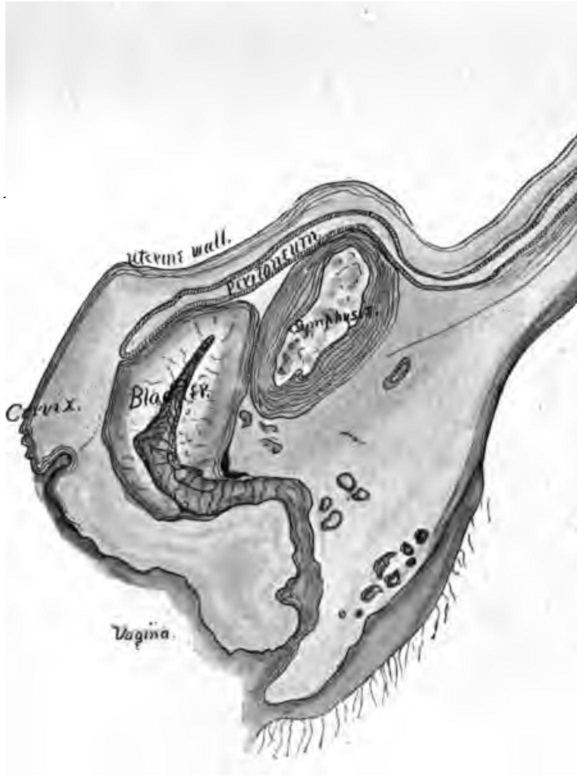


FIG. XXII.

Beginning dilatation of the cervix and ascent of the bladder. (Braun).

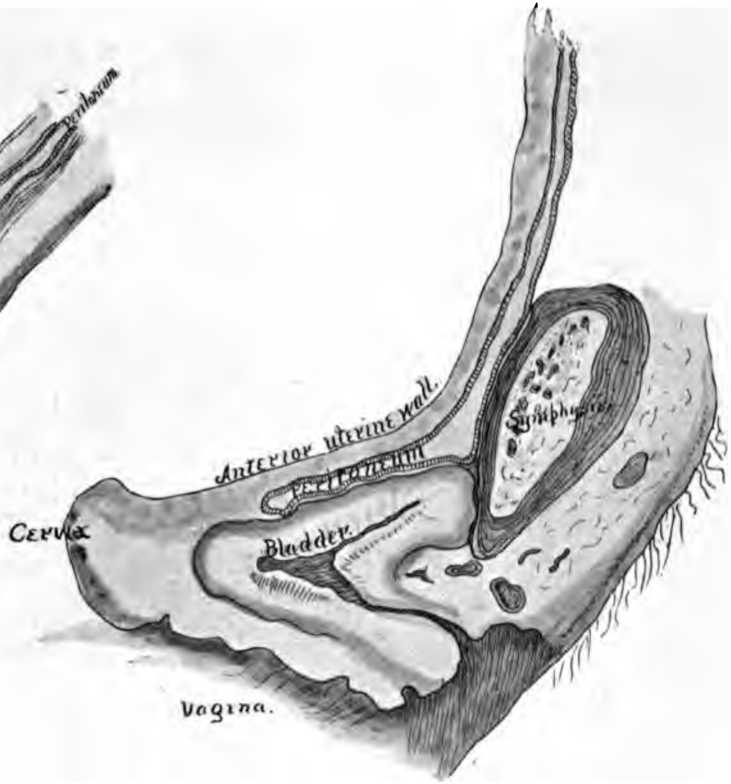


FIG. XXI.

Showing position of the bladder near term and its relations to the uterine wall and the peritoneum. The cervix is not dilated. (Barbour).

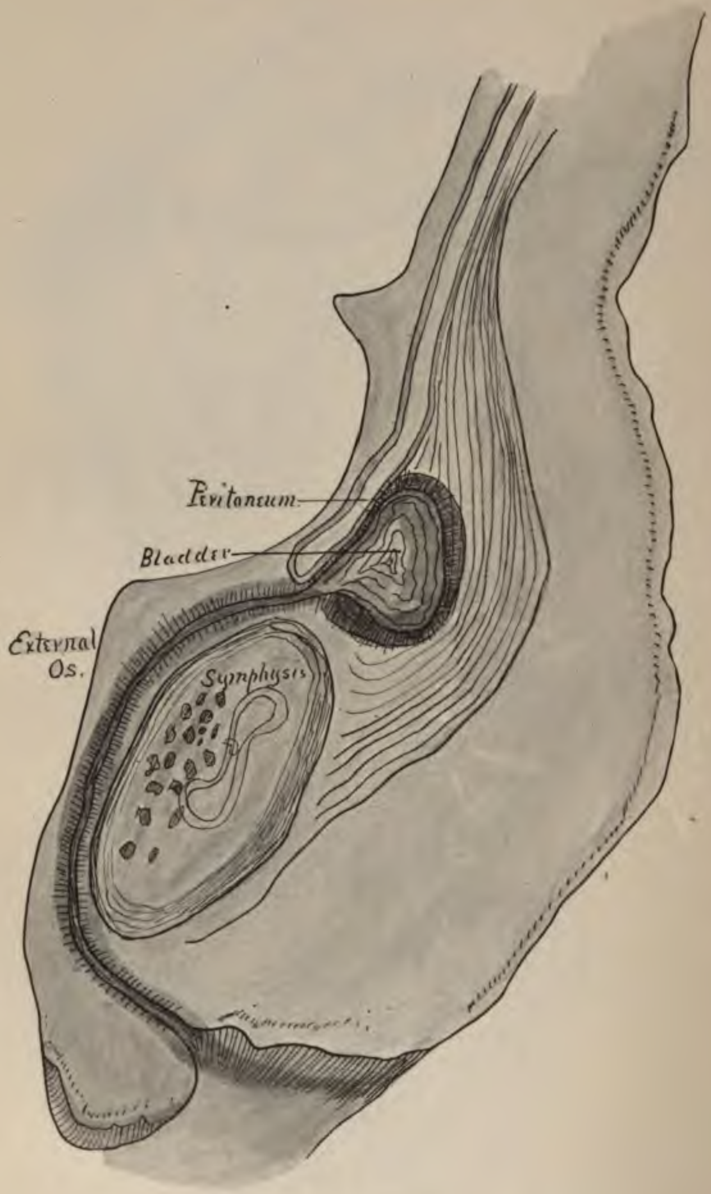


FIG. XXIII.

Full dilatation of the cervix and ascent of the bladder above the pubes. (Barbour).

lapse may also produce the same result. In a recent case of pregnancy the author examined the bladder at the fourth month, the patient suffering from bladder irritation when the uterus began to rise, and found the bladder cavity reached a point 26.7 cm. (ten and one-half inches) above the meatus, and 7.5 cm. (three inches) to the right of the umbilicus. This patient had suffered from violent manipulations in a craniotomy at her first labor, and forceps and version in her second labor. In a case of uterine fibroids and pyo-salpinx, in which the author did a hysterectomy, the bladder was found on exposure to be adherent to the fundus (a non-pregnant case) and was elongated some four to five inches. All gynecologists are familiar with such cases. A distended bladder is often the cause of delay in the first labor pains. The bladder in cases of distension is prone to get pressed or pulled down in front of the head. All these cases of bladder difficulty are liable to paresis following delivery, to require the catheter, to cystitis, and more or less chronic cystocele.

"Micturition Complete, Incomplete."—In ordinary ante-partum examinations we should not undertake catheterization simply to settle the question of thorough emptying of the bladder. The patient would not permit it, nor is it often needed. It is the only way, however, in which we can determine the question, and should we have reason to think micturition is not complete and is causing harm, we should resort to its use.

By reason of the fetal head pressing against the urethra and base of the bladder in pregnancy, the urine, not being freely expelled, may gradually accumulate and expand the bladder, forcing it to rise well above the symphysis, interfering with the free flow of urine from the kidneys, cause dilatation of the pelves of the kidneys, and in some cases excite eclampsia.

We should never put reliance upon the patient's statement that because she passes her water regularly and *thoroughly* the bladder is properly emptied, as she cannot tell that the bladder is empty. While emptying itself sympathetic contraction is set up in the uterus, which bears the head firmly against the urethra, the stream is shut off and the patient thinks the

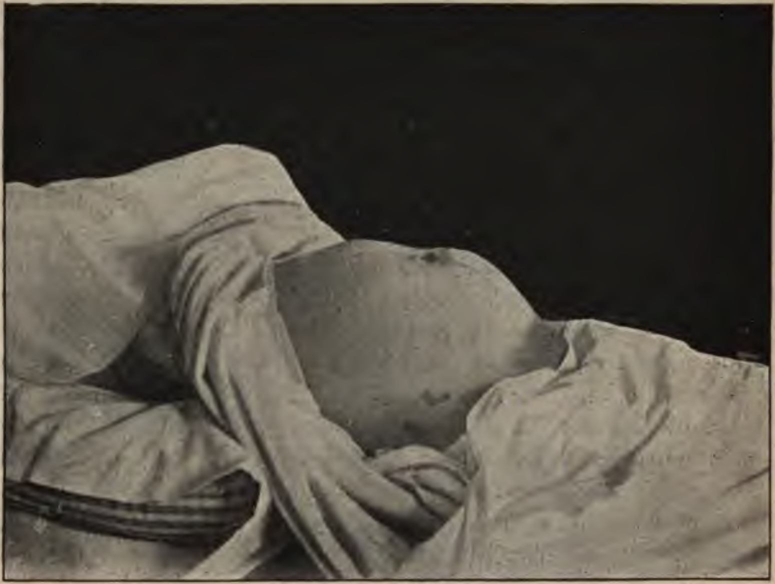


FIG. XXIV.
Bladder distended. First stage of labor. Caused by pressure of fetal head against the urethra.—Author's case.

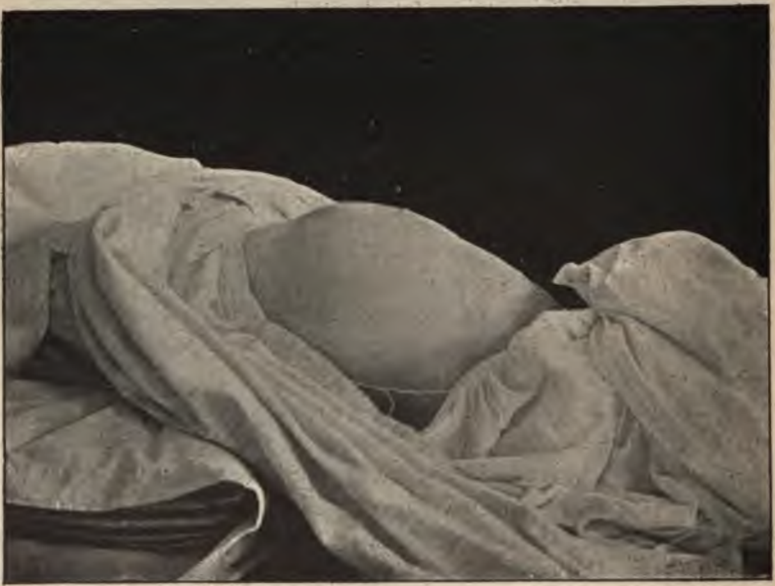


FIG. XXV.
Case of bladder distention (see Fig. 24). Patient catheterized,—Author's case

bladder is empty, as the uterine sensations substitute themselves for those of the bladder, which immediately becomes quiescent. Stagnation and decomposition of urine follow. Cystitis following labor is favored, and we all know how desirable it is to avoid this annoying complaint.

A full bladder may often be observed bulging the lower abdominal wall in pregnancy. The accompanying illustrations show such bulging very plainly (see Figs. xxiv and xxv). The patient was in the beginning of her labor. The second photograph was taken immediately after drawing off the urine, and without any change in the position of the patient.

The forceps should never be applied without first using a catheter. A distended bladder is at times the cause of retardation of labor.

It is not difficult to differentiate the distended bladder from the uterus, the former having greater elasticity on account of its much thinner wall. It is not so easy to differentiate it from an ovarian cyst, but of course the catheter can clear the mystery.

THE URINE.

General Considerations.—The question of proper attention to the character of the urine in pregnancy is a vexed one. Theoretically, it should be examined every two weeks at least. And yet how small a number of cases actually receive fortnightly examinations! It is probably a very small per cent. that are examined at all. While the various causes of eclampsia are not positively identified, we have a very satisfactory clinical knowledge of them. And the relations of the urine in its bearing upon the etiology of eclampsia is quite clearly defined from a practical standpoint. It is exceedingly rare to have a case of eclampsia with no alterations in the mechanical or chemical behavior of the urine. There may be eclampsia and no albumen and no casts present in the urine; or there may be albumen or casts present and no eclampsia, but if eclampsia supervenes there is almost certainly an increase in the color, or specific gravity, or a sub-normal secretion in twenty-four hours, or albumen, or casts. Some of these changes may show themselves only a few hours or even minutes before the eclamptic seizure; and, as we must believe that eclampsia is brought on through other than renal changes, that in some cases these urinary changes are consequent upon the convulsions. A patient may be feeling well, be so, in fact, indulge in an unusual amount of activity upon her feet, or "catch a cold," and with the renal and other emunctories already just able to sustain a healthful condition, the extra demand becomes the "feather on the camel's back," and urine that was found perfectly normal a few hours before becomes scant, of higher specific gravity, darker in color, perhaps solidifies on boiling, and consantaneously eclampsia is at hand. But, as has been said before, it is not the fatalities that cannot be foreseen that must decide our conduct, but the per cent. of fore-seeable and avoidable dangers for which we must labor. While always striving for the best rule, i.e., frequent and regular examinations of the urine, we can at least be always ready, and instruct our patients to inform us promptly in case of any disturbances of the emunctories.

The symptoms that the patient can observe are: decreased amount of urine, burning during micturition, increase in sediment, strong odor, darker color, dryness of the skin, or a cold, clammy condition of the skin, marked increase in edema of the limbs or feet, headache, blurred vision, dryness of the throat, a furred tongue, nausea, constipation, hardened passages, and a general dullness.

The examination of the urine, which it is inexcusable not to attend to in such conditions, should be accompanied by a careful observation of the other emunctories. Active elimination and restriction to a limited diet—chiefly milk—will ward off the majority of eclamptic attacks. Distension of the bladder can often be recognized by palpitation just above the pubes, and at times it shows to the eye, there being a bulging of the abdominal wall.

This latter demonstration is limited to patients with thin abdominal walls.

EXAMINATION OF URINE.

Note.—Urine specimens should be examined on the day of collection. If they need to be kept over night, preserve by adding not more than two drops of formalin to every four ounces of the specimem, or by placing on ice.

Description of Specimen. *Patient.* *Date.*

Nature of Specimen. *Volume* (*if a 24 hours' collection.*)

Color.

Specific Gravity.—Directions: Suspend the spindle freely in the urine (at room temperature) and record the reading of the lower meniscus on the stem.

Reaction.—Test with blue (if alkaline, red) litmus paper, and record whether weak, moderate, or strong reaction. Acid turns blue litmus red; alkalies turn red litmus blue. If the specimen gives both reactions faintly the reaction is amphoteric.

Urea.—Prepare the hydrobromite solution by mixing equal parts of the bromine and sodium hydroxide solution. Put 15 c.c. of hydrobromite solution into the large bottle; measure 2 c.c. of urine with the pipette into the small tube and place the tube in the bottle of hydrobromite, avoiding mixing the two. Put the connecting stopper tightly into the bottle, and with the aid of the thumb clamp and by raising or lowering the measuring tube adjust the column of water in the tube so that it will read at zero when the water on the outside is at the same height. After this adjustment is made and the apparatus is thus tightly closed, mix the urine and hydrobromite solution by tilting the bottle. When the reaction is complete adjust the water within and outside the measuring tube to the same height by raising the tube and read off this level on the measing tube, which reading is the volume of nitrogen evolved from the amount of urine used (2 c.c.). From this figure obtain the volume of grains for 1 c.c. of urine and the corresponding percentage of grains per fluid ounce by reference to the following table:

Nitrogen c.c.	Urea Per cent.	Urea Grs. in fld. oz.
1.0	0.27	1.22
1.5	0.40	1.83
2.0	0.54	2.45
2.5	0.67	3.06
3.0	0.82	3.67
3.5	0.84	4.28
4.0	1.07	4.89
4.5	1.21	5.50
5.0	1.34	6.12
5.5	1.48	6.73
6.0	1.61	7.34
6.5	1.75	7.95
7.0	1.88	8.56
7.5	2.02	9.17
8.0	2.15	9.78
8.5	2.28	10.40
9.0	2.42	11.01
9.5	2.55	11.62
10.0	2.69	12.23
10.5	2.82	12.84
11.0	2.96	13.45
11.5	3.09	14.06
12.0	3.23	14.68
12.5	3.36	15.29
13.0	3.49	15.90
13.5	3.63	16.51
14.0	3.79	17.12
14.5	3.90	17.73
15.0	4.03	18.35
15.5	4.17	18.96
16.0	4.30	19.57
16.5	4.43	20.18
17.0	4.57	20.79
17.5	4.70	21.40
18.0	4.84	22.01
18.5	4.97	22.63
19.0	5.11	23.24
19.5	5.24	23.85
20.0	5.33	24.46

Albumin.—(1) Clarification: *Every* specimen of urine should be filtered before testing for albumin. If not clear after a single filtration, pass several times through the same filter. If persistently turbid from decomposition, repeat the examination on a fresh specimen of urine.

(2) *Potassium Ferrocyanide Test.*—Mix about 20 drops (a quarter of an inch in a test tube) ferrocyanide solution with ten drops of acetic acid, and add to about an inch of clear urine in a test tube. Albumin forms a white precipitate in the cold. Record whether the reaction is negative, faint, decided or strong.

(3) *Cold Nitric Acid Test.*—To about half an inch of pure concentrated nitric acid in a test tube, add an equal or larger amount of clear acid urine (if alkaline rendered acid with acetic acid) by allowing the urine to flow gently from a pipette onto the surface of the acid. If albumin is present it will separate at the contact zone, forming a clearly defined white layer, the so-called albumin ring. This is not to be confused with a cloudiness or diffused haziness extending up into the urine above the contact zone. In the presence of mere traces of albumin this reaction may not appear till twenty minutes have elapsed.

Record whether the reaction is negative or positive.

(4) *Heat and Nitric Acid Test.*—(Alternate test to be used in special cases.)

Heat to boiling an inch of clear urine in a test tube and then add one or two drops of nitric acid. Albumin is precipitated as a white insoluble coagulum. Traces may form a slight turbidity only after standing twenty minutes, but in this instance always again heat the solution before forming a judgment. A precipitate of resinous substance is redissolved by a few drops of alcohol while albumin is not. Record whether the reaction is negative, faint, decided or strong.

Conclusion.—If the ferrocyanide and cold nitric acid tests are both positive, albumin is present. If either is negative, albumin is absent. From the intensity of the ferrocyanide reaction judge whether there is a trace, small, moderate, or large quantity.

Quantitative Estimation.—Esbach's Method: Fill the Esbach tube with the acid to the U mark, add the Esbach reagent to the R mark, stopper the tube and mix the contents by inverting several times. At the expiration of twelve hours read off by the scale the amount of precipitate. Each unit corresponds to a tenth of one per cent. of albumin.

The results are only approximate.

Sediment.—Allow a sufficient quantity of urine to stand in the stoppered sedimenter for ten hours in a cool place. To make microscopic preparations, remove with a clean pipette from the point at the bottom of the sedimentor a few drops of urine containing the sediment and place a single drop in the middle of each of several glass slides. Cover each with a clean cover glass and examine with the microscope.

Note (1).—If the sediment consists mainly of amorphous urates the urine should be gently warmed till the urates are dissolved before putting into the sedimentor and the sedimentor should then not be left in a place cooler than room temperature.

(2) If the sediment consists mainly of amorphous phosphates the urine should be rendered acid by addition of acetic acid before it is put into the sedimentor.

Casts.—Tube casts can be readily seen with a comparatively low power lens. The hyaline, owing to their transparency and near approach to the degree of translucency of the surrounding fluid, are the most difficult to detect. Next in order, in this respect, are waxy, epithelial and blood casts. A drop of staining fluid placed in the receiver a few minutes before the drop of urine is taken for examination will make the casts distinct in the field.

Sugar: (1) *Fehling's Test.*—Mix twenty drops (a quarter of an inch in a test tube) of the Fehling's alkaline tartrate solution, twenty drops of the Fehling's Copper Solution and forty drops of water: heat to boiling and if the solution does not change add twenty drops of urine and again boil. If sugar is present, a red or yellow precipitate is formed. If only a trace, the reaction may consist merely of a green milky appearance, only evident after the test has stood for twenty minutes.

Record whether negative, faint, decided, or strong reaction.

(2) *Fermentation Test.*—(Confirmatory.) Follow the direction on the box containing the fermentation saccharometer. Use urine to which no preservative has been added.

(3) *Phenyl Hydrazin Test.*—(Confirmatory.) To about an inch of urine in a test tube add five drops each of phenylhydrazin and acetic acid (50 per cent.) heat the mixture to boiling, and, if necessary, keep in boiling water for an hour. The separation of chrystals of phenylglucosazone when the solution cools, indicates the presence of sugar.

Karewski, in the *Birlin. klin. Wochenschrift*, 1899, No. 19, suggests the following procedure: Five drops of pure phenylhydrazin are added to ten drops of glacial acetic acid, and to this 1 c.c. of saturated salt solution. To this white cheesy mass, 3 c.c. of urine is added and the whole boiled in the test tube for three minutes. After cooling for some time, the presence of sugar can be detected by means of a macroscopic yellowish precipitate, if the sugar is present in greater quantities than 0.5 per cent.

Conclusion.—If the Fehling's test is negative, sugar is absent. If positive, the presence of sugar may be confirmed by either the fermentation test or phenylhydrazin test.

Quantitative Estimation.—Approximate by the fermentation method. More accurate by Purdy's Method.

REAGENTS.

Potassium Ferrocyanide: 5 per cent. solution:

Esbach's Albumin Reagent.

Picric acid	10 grams.
Citric acid	20 grams.
Distilled Water, to	1,000 cc.

Sodium Hypobromite Solutions:

Bromine Solutions.

Potassium Bromide	12.5 grams.
Bromine	12.5 grams.
Water	q. s. 100.0 cc.

Sodium Hydroxide Solution:

Sodium hydroxide	25 grams.
Water	q. s. 100 cc.

Fehling's Solutions:

Copper Solution.

Copper sulphate, cryst	3.4639 grams.
Water	q. s. 50.0 cc.

Alkaline Tartrate Solution:

Sodium tartrate, C. P.	17.3 grams.
Sodium hydroxide (sp. g. 1.12)	q. s. 50.0 cc.

THE SPECIAL INTERPRETATION OF URINARY SYMPTOMS.

Having considered the clinical means of ascertaining the actual condition of the urine and its possible variations from normal, it is now desirable to discuss their meaning.

Generally speaking, there are two classes of symptoms pertaining to the urine as bearing upon the question of eclampsia, which is much the most important ultimate of urinary examinations. One in which an abnormal condition is noted by the absence of certain elements or proportion of elements in the urine; and the other in which abnormalities are indicated by the unusual presence of certain elements in the urine. Thus, the decrease of urea in the urine is an indication of its abnormal retention in the blood; and again, the presence of casts in the urine is an abnormal presence in the urine.

Urine in Twenty-four Hours.—From a very practical point of view this is the simplest important sign of possible trouble connected with the urine. A decrease in the amount, when not caused by high temperature in the general atmosphere, is easy to note and easy to interpret. It is true that with some patients of the hospital class it is frequently difficult to get the amount saved and measured, as much of it is not saved, but with any woman of fair intelligence it is easy to accomplish, and no laboratory tests are needed to apply its meaning. Whenever the amount excreted in twenty-four hours falls below 40 oz., care should be taken to increase its secretion. Taking 53 oz. as the normal amount to be passed by a pregnant woman in twenty-four hours, and recognizing that there can be normal variations from 30 to 60 oz., yet it is better to be on the safe side in obstetrical cases. Decrease in the amount being passed is a sign that the patient has caught cold, or that the kidneys are becoming choked with an excess of solids, or mechanically water-logged by pressure on the ureters, or that the bladder is kept over full by the interference of the fetal head with the outflow.

The true bearing of the amount passed must be taken in connection with the specific gravity.

It is not so infrequent to find patients passing only from 12 to 15 oz. of urine in twenty-four hours, and sometimes, try as we will, we cannot get much increase in the amount; but we can so change the diet and awaken the action of the skin as to save the patient from what would be a disastrous result—eclampsia—and carry her along for several weeks.

Color.—The hue of the urine is an indicator to the eye of quantity and specific gravity generally. The lighter it is the larger the percentage of water and the amount being passed each day. The darker it is the more solid it is, and, we may say, the more serious its import. Sometimes it becomes quite red, going beyond the reddish brown color. This generally indicates the presence of blood, and calls for a microscopical examination.

Blood in the Urine.—Its presence should always be considered as serious. It may occur during or after labor without indicating more than a slight injury to the bladder in vaginal manipulations, but in the ante-partum stage its presence should be explained.

It may come from the vulva, urethra, bladder, ureters or kidneys.

In the latter case only is it apt to be a grave sign. Here it may be caused by great blood pressure and rupture of the glomeruli, as from the excessive use of turpentine or cantharides, or it may be due to kidney neoplasm. The writer recently cared for a pregnant who had hematuria amounting to an admixture of nearly 2 ounces of blood with a pint of urine at the seventh month of gestation, due to the development of a sarcoma of the parenchyma of the right kidney. This blood appeared several times and then disappeared. This blood reached the urinary tract through a breaking down of the tube walls leading to the pelvis of the kidney, as was shown on removal of the kidney two weeks after labor.

Specific Gravity.—The normal specific gravity of urin 60° F. is 1020. Variations ftom 1005 to 1030 are possible without indicating serious results; but less so in pregnants than in others. Particularly should any variation indicating the increase in the per cent. of solids be attended to.

Urea.—It is by the absence of urea that its determination becomes valuable. It being considered that when the condition of over retention of toxic elements in the blood is reached, its evidence will be found to some extent by the decrease in the amount of urea in the urine, and its corresponding increase in the blood.

The normal per cent. of urea in the urine varies much with exercise, temperature, and other daily occurring changes. According to Robin the daily amount excreted varies from 355 to 463 grains. Palmer gives the amount as 500 grains. He also gives a formula for calculating the per cent. of solids by taking the last two figures of the number representing the specific gravity and multiplying them by the number of ounces for the day. The product multiplied by 1 1-10 indicates the number of grains of solid matter in the given number of ounces. The average daily amount of solids excreted is given as 1,000 grains. (The Practice of Obstetrics, Jewett, pa. 155).

Davis found that a fall of 1. 5 per cent in the excretion of urea indicated excretory stimulation.

Albumen.—This has long been the element in the urine first sought, and, we might almost say, last regarded. But while it does not bear the importance it once did, when it was believed that it was always present in the urine in cases of eclampsia, or that it always appeared there before an attack, yet it should always be regarded when found in the urine as indicating a suspicious condition. There are numerous cases of eclampsia which appear before any albumen is found in the urine, and, in many cases, it appears in quantity immediately after the convulsions. This is a result of the convulsions and consequent congestion of the kidneys.

It is not necessary to name definite amounts of albumen present in the urine as calling for treatment, for any amount calls for some treatment. But should there appear such an amount as causes the urine to almost entirely coagulate on boiling the most active prophylactics should be employed—milk diet and elimination, and ingestion of plenty of water.

Sugar.—Glycosuria in pregnancy, in fact, the whole subject of glycogenesis is much of a mystery at present. But there is no special confusion as regards the clinical bearing of diabetes in pregnancy. It is a rare complication—1 per cent. being the statistical rate given. The mortality is, however, very great. Fifty per cent. of the mothers dying who go to full term and 40 per cent. of the infants. One third of the women so afflicted in pregnancy abort. In some cases diabetes is induced by pregnancy and disappears after labor. The form of sugar usually found in the urine is lactose. It is not worth while here to discuss the merits of Schenk's theory regarding glycosuria being an evidence of relative weakness in the ova being cast off by the ovaries.

Ludwig (*Wien. Klin. Wochensch.*, March 23, 1899), considers spontaneous glycosuria in pregnancy as an indication of toxemia, and perhaps of threatened eclampsia.

Treatment.—It is not intended to enter here into a discussion of treatment, this heading appearing in the chart more to record what was done. We have already indicated the treatment in so far as it is prophylactic. This treatment is simple and easily summed up as aiming to lessen the amount of solids secreted and therefore excreted, and increase the elimination of that which is present in the body in the form of unassimable material.

"Cystocele."—A cystocele during pregnancy is either antecedent to the present gestation and atonic in character, with the mucus membrane pale and flabby, or originates from interference in the return pelvic circulation, and is essentially congestive in character. The former variety is indicative of similar weakness in the expulsive powers of the uterus and suggests an inefficient labor. Cystocele is frequently produced by early application of the forceps in labor, when the cervix is not well dilated, whereby the bladder and its surrounding tissues are drawn down and stretched, and loses its resiliency. The cervix being torn often in such cases, involution is retarded, and by the time the patient gets about, a well-established prolapse of the bladder is established.

The condition calls for care in delivery to empty the bladder, and have it rise with the retraction of the anterior lip of the cervix. Cases have been recorded, where the bladder became a tumor of obstruction, being severely retroverted and unable to empty itself, the urethra being sharply flexed and closed.

There is special liability to cystitis in this condition of the organ. The urine is retained to the stage of decomposition, and catheterization is a probability. If this is not done with great care, a very troublesome inflammation of the bladder will result.

The cystitis may excite puerperal infection.

Distended and prolapsed bladders have been mistaken for the bag of waters and punctured. The differentiation is to be made first by following the sac forward with the finger to its anterior attachment, which will be found to be the base of the symphysis, and by noting that the finger cannot pass between this sac and the symphysis; and third, by using the catheter.

" **Rectocele.**"—This condition is due to a loss of support to the anterior wall of the rectum, just behind the internal sphincter wall. It is caused by a relaxation and stretching of the vaginal wall, or laceration of the perineum with improper repair, or distension of the rectum itself by fecal retention, or partial laceration of the sphincter ani muscles; or, lastly, disease such as cancer may account for it. Its presence—recto cele—may call for avoidance of long standing on the feet during the ante-partum period; but it particularly indicates care during the puerperium to avoid later prolapse of the womb. It has no special effect on labor.

" **Constipation.**"—Extreme cases of constipation. with impaction and dessication of feces, while very uncommon, are quite dangerous when present, and are apt to cause auto infection, peritonitis, intestinal ulceration and perforation. Many such cases have been recorded, and owing to the inattention hitherto given, and the tendency to attribute the symptoms to puerperal genital infection, we can fairly assume that many undiscovered cases have occurred. The bowels have somewhat the same tendency in pregnancy as the bladder to incomplete emptying, owing to their being abnormally crowded and displaced by the enlarging uterus. The relation that constipation of an ordinary kind has to the development of eclampsia is almost too well known to call for comment.

Danger from this source is greatest in primipara, the pressure of the uterus upon the sigmoid flexure and rectum being more decided, owing to the resistance of the abdominal wall to expansion.

Regularity in defecation and the character of the stools are valuable indications of the conduct and condition of the bowels, but careful palpation and percussion of the regions occupied by the intestines, and the character of the digestion should be carefully observed.

" **Hemorrhoids.**"—Many women suffer during pregnancy, and particularly during the first three or four days following delivery, from hemorrhoids. In some cases the hemorrhoidal condition is present before pregnancy, there being actual hyperplasia of tissue, the conditions of pregnancy very much aggravating their effects; while in others there is a hemorrhoidal condition that is purely a passive congestion of the anal mucus membrane, with more or less relaxation of the sphincters and extrusion of the rectum. These latter effects are very much increased, sometimes violently so, during delivery of the head, followed after delivery by extreme extrusion of the intra-anal mucus membrane, partial contraction of the sphincters, and more or less strangulation of the protruding pile.

Venous stasis, edema and some proctitis may then result, that cause great suffering. During pregnancy the passive congestion present can best be relieved by keeping the rectum empty, and having the patient rest in bed, lying upon her side to take the pressure of the presenting head from off the inlet. Following labor the application of a compress of soft cotton against the anus will aid in preventing tissue protrusion. An anodyne ointment may be required to allay the pain.

"**Pregnancy Single, Multiple.**"—Twins are often a surprise to the doctor as well as the parents; not because the physician could not discover two infants by palpation and auscultation, but from having ended investigation on satisfying himself as to the "presenting fetus." Attention to the question heading this paragraph will avoid the "surprise." The diagnosis of multiple gestation before delivery is ultimately decided by the recognition of the fetal heads and hearts. The variations from single pregnancies that will first attract our attention are: first, that indefinite want of clearness in the fetal outlines as a whole to which the practiced examiner is accustomed. As has been mentioned above, every fetus has some given attitude, which has its characteristics as a whole. We may find such a type of attitude, and yet find something more besides. Or to be more definite, when we have traced out the head, back and extremities of a fetus, we feel perplexed because we find other outlines, which do not seem necessary to account for any given fetal position. To the experienced examiner, this confusion, indefinite as it seems, is a more leading indication of multiple pregnancy than the one usually mentioned, in that in this condition the uterus is more rotund, or has a sulcus along the line between the fetal bodies. Second, the most likely factor leading to a correct diagnosis, is the palpation of a second head. The latter is always the most easily recognized part of the fetal body, it is hard and resisting, it is round, it can be palpated from nearly opposite sides of its sphere, it moves with a flexibility peculiar to itself, being pivoted to the shoulders, it moves under pressure without carrying the trunk through the resisting amniotic fluid medium. It may give the familiar symptom "ballottement," when the uterns is too tense to permit counter pressure of its opposite sides, and lastly it almost never lies so close to the other fetal head that the two cannot be separated and individualized. It may not be possible to reach it, as it may lie either well under its own body, or under that of its bedfellow, or too far under the ribs of the mother. It is then that we are most apt to have our diagnostic mettle tested. In making the diagnosis of the head we must learn to differentiate in palpation between fetal bones covered with muscle, as the trunk, breech, etc., and bone covered only with skin—the scalp. There is but one place on the fetal body which gives the same sense of bone hardness as does the head, i.e., the sacrum. But this area is so small, and surrounded by breech muscle, that it need not confuse. In cases of very tense uterus, where palpation fails, we can outline the head, if within reach, by a series of tappings with one finger.

" Change of Fetal Position, Probable, Improbable."— In palpating the fetus, we can estimate the amount of movement which can be easily accomplished under pressure, and determine the question of its remaining stationary, or moving to another attitude. The elements that influence are: the amount of amniotic fluid, the size of the fetus, the shape of the pelvic inlet, and its dimensions, and peculiar conformations or uterus or child. In hydramnion, the fetus is liable, by reason of the abundance of swimming room it has, to kick itself into various attitudes. Even when the uterus is very tense this is liable to occur. A small fetus is less likely to be held in one place than where it is large enough to be closely embraced by the uterus. Contractions of the inlet, particularly contracted conjugata, by preventing the head from resting in the inlet, as in a pocket, cause it to slide over to one or the other side, and provoke a shoulder, arm, or other abnormal presentation.

That the uterus, in some cases, has a peculiar form, which leads to certain fetal attitudes, against the customary tendencies of pregnancy, cannot be doubted. We can only note the effect of such peculiar forms. It would therefore count under this heading only by the bearing of previous pregnancies. The fetus, in its conformation, may influence the position, as in case of a large chest, which sometimes causes face presentations. The writer delivered a baby recently, which persisted in assuming a face presentation, after its correction to an occipital presentation. On delivery in the latter position, it was found that the chin could not be flexed upon the sternum, owing to stiffness in the joints of the cervical bones. The point of importance involved in the question of the change of fetal position is, whether if it lies in a mal-position at the time of our ante-partum examination, version is indicated, or if it shall be left to adjust itself, as most of a certain class do. And further whether if the fetus lies in a normal position, it is liable to change. At seven months pregnancy, we find a large number of mal-positions which revert to normal head presentations when the fetus grows enough to render "trim adjustment" necessary. For such cases the rule is: turn the fetus when it is getting fixed in a mal-position.

"**Abnormalities Requiring Treatment.**"—This question is inserted to allow for special conditions that cannot be individually mentioned here.

"**Probable Time of Labor.**"—A study of the facts we can obtain for naming the time of labor must show how difficult it is to be accurate in our prognosis. Not a symptom can be found but what has a wide range of variation. The date of "last menstruation" has not only a three week's range of uncertainty, but now and then patients will menstruate one or more times after becoming pregnant. The author reported a case of menstruation for six months after impregnation. Life may be felt from four to five and a half months before delivery. A patient under the writer's care felt life on the eighth of March, 1896, and was delivered on the eighteenth of August, five and one-half months later. Moreover the child only weighed six pounds. The "height of the fundus" may vary from the rule as to the distance from the ensiform several inches—or the equivalent of one to two months—owing to the uterus lying low in the inlet, or to the smallness of the fetus, or to the want of amniotic fluid, or to the laxity of the abdominal walls, which permits the fundus to sag and expand laterally; or the fundus may run above the line generally given, from the excess of amniotic fluid, twins, or a large single fetus, or general elevation of the uterus from contraction of the pelvis. Again, prolonged gestation proves that there is no exact, physiological condition which precipitates labor. But notwithstanding all these perplexing variations, we can by a careful consideration of the combination of symptoms foretell the time of labor within a week, in a good majority of cases.

"**Probable Character of Labor; Quick, Medium, Slow.**"—The elements that help to decide the general character of labor, are largely as follows: The general strength of the mother, the strength of the uterine muscle, the degree of its distension, the ease of dilatation of the cervix, the size of the inlet and fetal head, the position of the fetus, and many variable conditions that cannot be specified here.

A careful examination will enable us to predict a certain type of labor with gratifying accuracy in most cases. The main questions to determine are: Whether the fetal head presents, whether it will pass through the pelvic canal without moulding, whether after a limited amount of moulding it will pass through; whether, judging from the general strength of the mother, she will retain sufficient muscular energy after moulding has been accomplished to complete delivery, or whether forceps will be required; whether forceps traction will be sufficient to deliver, or whether an operative treatment will be demanded. In short three distinct elements present: The resistance of the soft parts; the cervix, pelvic organs and surrounding tissues, vulva and perineum; partial bony obstruction requiring fetal head moulding; and absolute bony obstruction preventing self-delivery. Consideration has been given to these points and many others in detail, that if carefully studied, and extensively practiced in bedside study will give us such skill in prognosis that in the majority of cases we will come to the management of cases in labor prepared to exercise a wise judgment as to the amount of energy the mother must be required to exert without assistance, and as to how best conserve her forces, when perhaps taxed to their limit. It is an easy thing to "make a botch of a labor." It is a brilliant achievement to do just the right thing at the right time in a difficult labor. The mortality in Cæsarian section and symphysiotomy is many times greater in emergency management than it is in "forewarned" cases.

"Moulding of the Head; Necessary, Unnecessary."—To answer this question sum up all the facts bearing upon the dimensions of the pelvis and fetus, the external measurements, internal measurements, size of the mother, history of previous labors, size of the fetus, its position, Müller's test of head engagement, etc.; and, with practice, such success will be achieved as will be both a surprise and pleasant advantage. Whipping up the uterus to hasten the process of moulding is not a wise act; it would cause severe damage to the child's brain to have it done in a hurry. We, therefore, conserve the mother's energies, and seek to sustain the patient's morale while this is going on, rather than employ oxytoxics, or rupture the amnion.

" **Mother's Strength Sufficient.**"—Closely allied to the foregoing is the need to know how much strength is possessed by the mother. First, as to her general condition and natural force. Is she in non-pregnant life hearty and strong, or weak. Second, in her pregnancy has she kept her blood standard; has she taken enough exercise to keep her muscles in good condition, or has she grown anemic, edematous, and sat still and staid in her room during the last month or two. Have her bowels been working well; what is the strength of the abdominal muscles; is the uterine wall thick or thin; is there hydramios; and always what amount of dystocia has she to overcome. If these questions are met sometime before labor there is opportunity to greatly improve undesirable conditions. Regulation of the bowels, the improvement of the appetite, proper exercise, massage, diuresis and diaphoresis are means that readily suggest themselves. Many women, on superficial observation look well, who are sitting or lying down most of the time, but who " go all to pieces " immediately after labor, and are invalids for a long time thereafter. They were mere shells of health, soft, and only appearing to be doing well, because they were like cold blooded animals, living under such low pressure that there was no demand to disclose their weakness.

" **Operative Interference Indicated.**"—It is only in extreme cases of pelvic dystocia that we can definitely forename the form of operative assistance in cases. Thus, we can easily say that the proper thing in pelvic contraction to two inches calibre calls for Cæsarian section; or, in a transverse position, version is indicated. But in the border-land cases, which are far the most frequent, it will be hard to say that forceps will be sufficient, or symphysiotomy will do; or induced labor at the thirtieth week will secure the delivery of a living child. Yet we can so closely approximate the method required that the full advantage of absolute prescience can practically be attained. How often it happens that physicians, following a widely prevailing custom in obstetrics, of simply meeting difficulties as they develop, making no careful ante-partum investigations to determine exact conditions, or even doing so in labor, make the grossest blunders, one after another, until, when they have fully realized the situation, find the opportunity gone for proper management. Ignorant of perhaps the presence of a mal-presentation, or of pelvic contraction, or an intervening tumor, or a hydrocephalus, or a monstrosity, or locked twins; and wondering or growing impatient at the unreasonable delay, they rupture the amnion and wait awhile to observe the effect of this masterly performance; then, with the amniotic fluid drained away, apply the forceps, give a friend a chance to try bis strength; then try internal version in a closely contracted uterus, or do a craniotomy with the cervix swollen by edema, and, if we could see it, black with ecchymoses, the child dead and the mother exhausted.

It is a splendid rule, both for self-training and stimulation, to regularly outline the steps that will be taken by Nature, or followed by the physician, in every case of labor.

" **Final Diagnosis.**"—Here should be recorded the essential and important features of the case. These would include the period of pregnancy, fetal position, and any abnormal or threatening conditions, such as contracted conjugate, or hydramnion, placenta previa, etc.

CHAPTER VI.

HISTORY OF LABOR.

Premonitory Indications of Labor.—Previous to the presence of actual pains, the two most frequent and positive signs are: settling of the lower uterus and presenting part of the fetus into the true pelvis and beginning obliteration of the cervix with more or less dilatation. A third indication might be added, that of occasional flitting pains of the uterus.

Sinking of the fundus, when it occurs before labor (it is not a noticeable occurrence as a rule), may take place at any time within two weeks of labor. The writer feels free to confess that this act is obscure in cause and difficult often to observe. The refusal of the abdominal wall to expand further, thereby forcing the uterus to enter more deeply into the pelvic basin, is the usual explanation, but one can think of so many cases of exception that faith is greatly weakened. Abdominal pressure is in many cases very severe much earlier than two weeks before labor, but no sinking of the fundus takes place. In others sinking occurs where the abdominal wall is very loose and flaccid. In typical cases of its occurrence the woman feels less abdominal fullness and breathes more freely. Sometimes her pulse rate becomes slower. This grateful ease in the upper abdomen is apt to be met with added discomfort in the lower pelvis and limbs. The new burden is in fact, for diagnostic purposes, the plainer of the two conditions. Increased pressure in the true pelvis annoys the rectum, bladder and blood vessels. Walking is painful, and swelling and glairy mucus discharge tinged with blood may follow. This "show" is due to slight separation of the chorio-amnion near the internal os, and at times to extrusion of the cervical mucus plug.

In many women the uterus and fetal head rest quite low in the pelvis from the seventh or eighth month to labor. This is only the case where the parts generally are relaxed and flabby.

Changes in the cervix follow no rule, but we can safely consider a woman nearer her labor whose cervix has flattened and perhaps dilated to one or two fingers' width than one in whom it retains its distinct canal.

Sometimes the uterus seems very uncertain whether to proceed to labor or not. Pains which the patient, even one who has had children, cannot distinguish from real labor pains, come days or weeks before labor, last for a few minutes or many hours and then cease. They generally indicate that genuine labor is not far off.

Escape of amniotic fluid in any amount is a very certain sign that labor is about to begin. Perhaps we should except those infrequent cases of what have hitherto been called "endometritis catarrhalis gravidarum," but are now believed to be not a catarrh of the utricular glands, but escape of amniotic fluid through a perforation or rent of the amnion. Even here, however, labor is excited when the amount of liquor escaping is over a pint.

No diagnostic change in the urine or blood has been discovered indicating labor.

" General Condition of the Patient."—The proper time for noting the general condition of the patient, though occurring in the History Chart at the beginning of labor, is earlier. The more important points to note are: toxemia which may threaten eclampsia, anemia or chlorosis, constipation and muscular tonus.

Nearly 70 per cent. of cases of eclampsia occur during labor.

This is, then, the most dangerous time; but labor would not excite eclampsia were not the patient's emunctories behind in their work at the time labor begins. This subject receives consideration on page 116.

Anemia and chlorosis are rather frequent in pregnancy and affect the patients in labor chiefly by general and muscular weakness, causing inefficient pains. Post-partum hemorrhage is more than usually liable to occur. Fetal premature death is quite possible, although the fetus acts like a true parasite by taking to itself what it needs in nourishment whether the mother gets a sufficient amount or not.

With pregnant women it must not be assumed that because a daily action of the bowels occurs constipation does not exist. The uterus and fetus may so fill the pelvis as to interfere with free evacuation.

Women are sometimes so "soft" in muscle that they become exhausted early in labor. Careful attention to these points before labor will bring patients to the trials of labor vastly better able to overcome them than if left to their own inclinations.

The Preparation of a Patient for Labor.—If the bowels have not been as active as they should be, the patient should be given a saline cathartic at the beginning of pains, unless there does not seem to be time for defecation before the conclusion of the second stage. In all cases the nurse should be instructed to administer an enema of soap and water. This should be given with an eighteen-inch rubber tube and carried into the sigmoid flexure. A tub bath in warm water is usually desirable, otherwise a careful cleansing of the pelvic region should always be given.

No solid food should be allowed. A simple system of arrangement of the patient's bed and person is as follows: Lay over the mattress a large rubber sheet that will entirely cover it. Lay a full sheet on this, and upon this place a piece of rubber sheeting four feet square and pin it squarely to the mattress. Place a clean linen or cotton sheet folded twice upon the last rubber sheet and also pin it down.

When the patient takes to her bed let her wear only her chemise. She should take an ordinary clean sheet, and after folding it once, place it around her waist, pinning it behind with a large safety pin. The chemise should next be raised above the waist and fixed to stay there. The patient will then have her body protected by the chemise and sheet, while the former will be out of the way of discharges and the sheet will not lie under her, being open from waist to the feet, and will not become soiled either. The leggings used generally in hospitals, which are crudely made to simply slip on over the feet and reach to the middle of the thighs, are well adapted to use in private practice. The patient can be instructed to make them during her pregnancy. A Kelly pad placed under the hips and covered with a clean cloth will still further assist in lessening the soiling that is such a disagreeable accompaniment of most labors.

Before any examination of the vulva is made the nurse should wash the pubes, groins, buttocks and anal region with soap and water and then bi-chloride solution of moderate strength, 1–5000.

The vulva and introitus vaginæ should be carefully and gently wiped with cotton that has been sterilized and dipped in bi-chloride solution. The nurse should take pains to cleanse all the crevices around the clitoris and in the folds of the labiæ.

This region can never be considered safely aseptic except it be made so. The vagina is so generally aseptic in itself that it is best not to administer a douche. The special exceptions to this are noted on page 83.

The physician should prepare himself for making examinations by thorough scrubbing of the hands and arms with soap, warm water and a nail brush. In hospital work the brush should be kept in a bi-chloride solution. The hands should then be scrubbed in bi-chloride solution. Generally no unguent need be used upon the fingers, but at times it is desirable. In hospitals the best unguent is vasaline prepared by boiling it twenty minutes in a small tumbler, then placing this vessel in a larger glass filled with bi-chloride solution deep enough to entirely immerse the inner vessel. A glass cover should be kept on the outer vessel. For the obstetric bag vasaline or lanoline may be carried in metal tubes such as are used by artists for paints. Care is necessary to keep these tubes aseptic about the mouth.

Should the physician have reason to fear that manual asepsis is not assured by cleansing, having had his hands too recently in contact with pus, or cadavers, or infectious diseases, etc., he had better wear a rubber glove on the examining hand. If he has a cut or abrasion, collodian should be applied and carefully dried, and a rubber cot should be worn by the finger.

An abdominal should precede the vaginal examination. This examination should seek to determine the presentation and position of the fetus, even though this may have been learned within a day or two. The fetal heart sounds should be noted, and also the condition of the bladder. This abdominal examination may be made before the hands have been cleansed, otherwise they should be recleansed. When the hand is ready for the vaginal examination care must be exercised to keep it from touching anything whatsoever. A trained obstetrician should have such care in the nature of a habit or instinct.

The Obstetric Bag.—To manage an obstetric case at the home of the patient in a first-class way two doctor's obstetrical bags are needed, one for dressings: cotton, gauze—plain sterilized and iodoform also sterilized, and placed in a glass cylinder corked--an abdominal binder and half a dozen napkins or vulva pads. These articles should be sterilized at the doctor's office and neatly pinned in muslin. This bag—of which a busy obstetrician should obtain several—can be left carefully locked at the patient's home shortly before the expected confinement. The vulva pads or napkins should be made by laying a piece of plain gauze one foot square on a table and placing cotton waste 3 x 10 inches in the middle and folding this in the muslin. These pads can be placed in the sterilizer after they are made up.

The second bag should contain: bottles with screw caps holding fluid extract of ergot two ounces (or ergotole liquid or pellet), carbolic acid or lysol two ounces, bi-chloride tablets, solution of nitrate of silver two per cent., sterilized one-eighth wide and ten inches long flat tape in a saturated solution of boracic acid, chloroform four ounces, sealed glass tubes containing catgut, silk worm gut and silk; a long and short pair of obstetric forceps, a needle holder, a pair of scissors, a scalpel, two artery clamps, perineum needles, subnitrate of bismuth and boracic acid powders, a sterilized catheter of soft rubber (glass and metal catheters should not be used in labor), a vaginal and uterine douche nozzle, a two quart rubber fountain syringe, an 18-inch rubber rectal tube, sterilized salt two ounces, safety pins, a hypodermic syringe with morphine, strychnine, digitalis and nitro-glycerine in triturates.

Vaginal Examination During Labor.—While the trend of modern obstetrical thought and teaching has been in favor of developing to the full the abdominal examination and severe restriction of the vaginal it is unwise to discard the latter entirely, as some extremists have advocated. There are too many points which can only be obtained by a vaginal examination that are necessary to an intelligent management of labor; and special abnormalities are possible whose presence would only become known by such examination, and which should be recognized early to permit of our discarding the procedure entirely. The character of the cervix, the condition of the amnion, the attitude of the presenting part to the inlet, the conditions of the rectum, bladder and vagina are points needful in a large number of labors. While such abnormalities as prolapsus funis, decent of an arm or leg, impaction of an ovarian tumor in advance of the fetus, placenta previa, retroflexion and distension of the bladder, exostosis, atresia vaginæ, abscesses, etc., should be discovered promptly, and could not usually be recognized by an abdominal examination.

One, two, or three vaginal examinations are usually sufficient in a labor. These should be very brief and gentle enough to avoid causing any abrasions. An experienced obstetrician should be able to learn all points needed, except head engagement in contracted pelves and the direction of the occiput by palpation of the sutures and fontanelles, in ten seconds. In making the examination the physician should separate the labiae minoræ with the thumb and second finger of the unengaged hand and then introduce the first and second fingers of the examining hand.

"Pains Began."—The beginning of labor dates from the commencement of rythmic uterine contractions, which grow progressively more frequent until occurring every two, three or four minutes and which are accompanied with softening of the cervix. It is much more important to properly interpret so-called "pains" than is generally supposed. It is a very frequent error made by attending physicians of actively assisting delivery, because the patient has *been having pains* for 24 or 36 hours with no progress. This is a grave blunder and amounts to an unnecessary performance of an *accouchement forcé*. False labor pains may simulate true labor pains in the behavior of the patient and the uterine and abdominal muscles. But they are not followed by softening, flattening or dilatation of the cervix. Some women will go about in apparent labor for two or three days and make no progress. They should not be examined much, and should be put to bed, given a cathartic and perhaps a dose of morphine, or bromide of potassium, or chloral hydrate, and be told that they are not in labor.

The diagnosis of labor pains is based upon the statement of the patient and evident phenomena.

It is the rule for patients to feel more or less vague preliminary pains before there is any evidence of muscular contractions or attitude of the patient suggestive of pains. They are termed backache, shooting pains down the thighs or across the abdomen. Inclination to pass water is increased; aversion to food, due to anxiety, may develop. Notwithstanding what is written above regarding "false pains," it is always better to assume that pains are "true" until proven otherwise, and proper preparations made for a near delivery.

Preliminary pains are usually not rythmic. For the record a labor should begin from the time when rythmic pains commence. The dynamic measurement of a labor should be counted from the time when the pains are at least as frequent as every five minutes. A trained obstetrician estimates the amount of expulsive energy that has been put forth, not by the clock, not by the patient's cries, not by the number of pains, not by the results, but by all these and the character of resistance overcome. It is true that a patient may become worn out by pains that are not real labor contractions, but, for instance, forceps would not be indicated, but an intermission of rest.

Labor pains in a broad sense include all muscular effort applied toward forcing the bag of waters and presenting part of the fetus against the internal os and on through the parturient canal. The muscles chiefly employed are the uterine and those of the abdomen and diaphragm. Contractions of the uterus usually begin first, the voluntary muscles not being added until some dilatation of the cervix is accomplished. Generalizing, the nearer the fetus comes to delivery the greater the power of the voluntary force applied. The only exceptions to this are in cases of exhaustion before delivery, or specially painful conditions of the vagina which cause the patient to avoid further fetal descent if she can.

In early stages patients resist sometimes, do not "bear down" from fear, hyperesthesia, hysteria, a distended bladder, even modesty. Rarely a little chloroform, or morphine, will, by blunting the sensibilities, cause an increase in the use of the voluntary muscles. When the uterus contracts, it will be seen to sink at the fundus, and the part just above the umbilicus will bulge outward. These alterations are due to the fact that contractions of the entire body of the organ tend to obliterate Barnes' curve—the bending of the middle portion around the sacro-lumbar curve. To the touch the uterus is felt in the course of one to five seconds to harden.

Holding the breath during a pain is, of course, compulsory when the voluntary muscles assist, but if done when only the uterus contracts it is due to the suffering caused. When the voluntary muscles are used to aid the uterus a condition exists for the time being similar to that in a severe effort in defecation, or even to that of an eclamptic seizure without the loss of consciousness or the biting of the tongue. And it is well to remember that so customary a performance as voluntary effort at expulsion of the fetus may lead to violent asphyxiation of the blood. This idea will be further expanded later.

"Fetal Position."—This should be carefully determined as soon as the patient is seen, first by abominal examination, and then after careful cleansing of the hands, by vaginal palpation.

"If Head Presentation, Anterior or Posterior Fontanelle in * * * Position."—Vaginal examinations should always be limited to the least and most gentle manipulations necessary. As these examinations have been the chief reliance hitherto with a grievously large number of the profession in making diagnoses of labor conditions, extensive and unnecessary manipulations have been applied to the grave peril of mothers. These manipulations should be performed with clean, gentle and intelligent hands. The character of the soil is half the crop. Abrasions caused many hours before delivery through rude manipulation prepare the mucous membrane for infection. It is not often that we must learn the positions of the sutures and fontanelles to clearly understand fetal positions, but they strengthen our diagnoses, and cannot be wholly abjured. Their recognition is generally permissable only after dilatation of the cervix, and comes at a time when, if mal-positions exist, their correction cannot be easily performed. The chief value of location of the sutures and fontanelles lies in the recognition they give of posterior occipital presentations, and in case of application of the forceps, whether the occiput lies to the left or right. The fontanelles can at times be outlined before the cervix has dilated. They and the sutures can be felt through the unruptured amnion. The recognition of the sutures is obtained at the junction of two or more bones, *i. e.*, a fontanelle. Under great uterine pressure the cephalic bones may be so closely compressed and overlapped as to close the fontanelles. The posterior fontanelle, which is triangular, lies near the middle of the pelvic canal in occipital presentations. The saggital suture points the direction of the occiput. It is not easy to differentiate it from the lambdoidal sutures. In brow presentations the anterior fontanelle may be felt.

The fetal brow or eye may be felt. The features come more within reach in face presentations. The author has long believed and so spoken in the class-room, that in forceps application, where the forces of nature which direct the occiput under the pubes in its approach to the outlet are interfered with, the physician should be *absolutely sure* of the direction of the occiput before applying the blades. Two steps are accordingly advised: to introduce the hand, or rather fingers, far enough within the cervix to feel an ear and by it learn the exact attitude of the occiput, and to apply the forceps slightly out of the pelvic median line so that when they are drawn down and forward their tendency will be to bring the occiput under the pubes. Thus, if the occiput lies well up in the pelvis and to the left transverse, the inner end of the upper blade should be placed with its posterior edge close to the promontory on the left, and the other blade correspondingly opposite, bringing its anterior edge near the right side of the pubes. The forceps pulled downwards and to the median line will bring the occiput under the pubic arch. As this application of the forceps is as much of an evil if we mistake the direction of the occiput, as it is an advantage in a correct diagnosis, we are compelled in this method to employ intra-cervical examination to be perfectly sure of the head position. Under the conditions that should exist when forceps are to be applied, i.e.; with the cervix relaxed and dilated, this manipulation is simple, and, when properly done, devoid of risk. Many cases of posterior occipital deliveries are due to the forceps, which prevent the sacro-sciatic ligament from acting as a "bumper" against the parietal eminence whereby it is pressed forwards. When the head has descended and become impacted within the inlet we must rely upon abdominal palpation, the position of the fetal heart, and the sutures and fontanelles for locating the direction of the occiput.

"**The Bladder Empty, Full.**"—Supra-pubic palpation may outline a full and elevated bladder. Its condition may interfere with and retard uterine pains or affect the fetal entrance into the inlet. A soft catheter should always be employed, as the head of the fetus may press upon the uretha, which would be wounded by a hard catheter. It may be necessary to gently press the presenting head away from the uretha in passing the catheter and in the passage of the urine. The bladder may fill and lie below the descending head, being emptied violently by direct pressure of the advancing head. Or, rarely, it may be sharply retroflexed and be unable to empty itself no matter how much pressure may be brought by the advancing head. Unless emptied by the attendant it may be compelled to rupture. It has been mistaken for the bag of waters, or an ovarian cyst, and punctured.

It is better to draw off the urine always on applying the forceps.

The vulva and meatus should be cleansed before introducing the catheter.

"**Fetal Heart: Heard to Right, Left, Above, Below Umbilicus.**"—The point of greatest intensity of the fetal heart sounds should be determined when a patient is in labor, at the time of making the abdominal examination. This time should be just previous to when an examination of the vagina is made. This point determined increases the accuracy of diagnosis of fetal position, and in case of clinical instruction increases the need of being careful. A study of the chart "History of Labor" will show how difficult it will be for a student to record carelessly, or by guess, the points required without his mistakes, or inconsistancies, being easily observed. Thus, let us suppose he records that the "fetal heart" was most distinctly heard one inch below and to the right of the umbilicus; that the "fetal position" was L. O. P.; that the "posterior fontanelle" was presenting; that the "axis of the sagittal suture was from right anterior to left posterior; that the "right shoulder" was delivered "under the pubes"; that the "occiput restituted" to the right on delivery of the head, and that under the "Child's History" he records a caput succedaneum as being found on the right parietal eminence. It would be evident (assuming that he correctly observed the occiput to restitute to the right) that he erred as to its being a case of L. O. P., or that the right shoulder came next the pubes. In short, his several points of diagnosis must harmonize.

"Fetal Pulse at * * * o'clock * * * at * * * Just Before Delivery."—It is intended by this heading to have at least three records of the fetal pulse during labor, one when the patient is first seen, one between this and the third which should be taken shortly before delivery.

When we consider that, in labor, we have *two* lives involved, and that auscultation of the fetal heart sounds is almost *the only indicator* of the little one's vitality, careful and repeated auscultation becomes a duty and necessity. It is well to get an early record of the fetal pulse, that we may have its normal individuality established.

It is possible for a fetal pulse to rate at 120 or 160 a minute and be considered normal, but rarely so, the usual rate being from 135 to 145.

Forces which quicken the fetal pulse during labor are largely those which quicken the mother's pulse—alcoholic stimulants, strychnine, hemorrhage, anesthetics, exhaustion, etc.

Forces which slow the pulse are: uterine contractions, especially from oxytoxics; compression of the head, either in moulding or forceps traction; compression, or handling of the cord; version, etc. Many forces, of course, produce both a quickening and slowing of the pulse, but the above diversion indicates the main tendencies of the forces mentioned. Death occurs in some cases as the climax of a progressive quickening of the pulse, with decreased volume and tension, the rate advancing to 170 or 180 a minute. With others it follows a gradual retardation, seldom falling below 75 beats to the minute ere death comes.

Normal uterine contractions slow the fetal pulse, probably by causing compression of the uterine sinuses, and, with reduction in volume of the uterine contents, by compression of the placenta. The fetal pulse returns to normal between pains, except in prolonged labor, when it begins to beat with abnormal speed, slowing below normal again if the fetus dies. Ergot produces death of the fetus by preventing intermissions in uterine contractions, possibly also by direct poisoning.

Special conditions which suggest close observations of the fetal heart are: hydramnion—anemia, nearly always existing in both mother and fetus; dry labor, the want of liquor amnii causing undue compression of the fetus; syphilis, the placental circulation being poor from the accumulation of epithelia in the intima of the vessels; breech presentations, the cord being more liable to compression; prolapsus funis, for the same reason; disproportion between head and pelvis, causing moulding; eclampsia, by asphyxiation or direct poisoning; and placenta previa, causing hemorrhage and asphyxiation.

Forceps always threaten fetal death through compression of the head during tractions.

The fetal pulse is our chief reliance for intervention labor as regards the interests of the child, and in certain conditions directs action taken for the mother's benefit. Our means of remedy in the first class are therapeutic, or mechanical. We can, of course, treat the fetus only through the mother, in asthenia by stimulants, fresh air, or oxygen inhalations; or by withholding anesthetics if they are the cause; in asphyxia by similar means and, at times, by quieting uterine action. By mechanical means we may help by any means which hasten delivery—cervical dilatation, forceps traction, replacement of a prolapsed cord, correction of malpresentations, unlocking of twins, version, symphysiotomy and Cæsarian section. These procedures are largely bound up in the mother's needs.

Diagnosis of fetal death cannot be definitely determined by auscultation. Direct intrauterine palpation of the cord is the only certain method, and, at times, this cannot be done. Craniotomy has been performed many times when the fetus was supposed to be dead, but still lived. No matter how extended has been our experience in the lying-in chamber, we frequently are surprised, if not regularly listening to the heart, to see a child born alive, which, it would seem, could hardly be other than dead. But if we have been auscultating the fetal heart properly during labor we will know its trend, and thus be able with greater accuracy to determine that it is alive or dead.

Fetal movements are a very unsafe guide during labor to questions of vitality.

"**Last Defecation.**"—The intestinal tract is much neglected both in pregnancy and labor. During pregnancy there is often both an interference in the physiological function leading to regularity of defecation and a mechanical obstruction, the former causing ordinary constipation and the latter impaction of the lower bowel. It seems strange that, with the excessive displacement and crowding the intestines must suffer to give place to the rising and enlarging uterus, there is not greater difficulty in pregnancy from their behaviour. When distended the intestines may be mapped out by abdominal palpation and percussion. The lower sides of the abdominal cavity, the portions lying just below the free border of the ribs, and that across the fundus are the regions affected. Marked tympanites, shortness of inspiration and irregularity in heart action, with the uterus too small to account for the heart and lung difficulties, make a combination in constipation, in connection with a history of infrequent or insufficient defecation, that sharply indicates intestinal stagnation which should be remedied. Aside from the discomfort caused, there is danger of eclampsia.

The retention of decomposing fecal matter causes an accumulation and further generation of poisons which help to precipitate eclampsia, and the distention of the intestines presses the uterus downwards into the pelvis, interferes with the return circulation from the lower limbs and pelvis, and aids in disturbing the work of the kidneys. The same rule should prevail in labor preparation as for an abdominal operation, to secure free emptying of the bowels first. We often have no opportunity to apply this rule in cases of pregnancy, not perhaps seeing the patient until labor has begun. It is well to give a laxative, even though labor has begun, if the patient's stomach is in reasonable condition to take the medicine. Patients who pass through labor without free cleansing of the bowels will generally develop a rise of temperature of from one-half to one degree, or more, immediately, due solely to the intestinal condition. Patients will usually throw off the immense tissue waste resulting from severe muscular exertion of labor without difficulty if the intestines are well emptied, but otherwise the great demand for elimination is too much and fever results. Thorough catharsis will bring the temperature back to normal.

"Enema Given."—Unless very thorough catharsis has been obtained in the beginning of labor, a patient should always receive an enema, if possible several hours before delivery. A half to one quart of soap suds and warm water is suitable.

"Occiput, Chin, Breech, Arm, r.l.; Foot, r.l.; Engaged at."—The diagnosis of the part presenting should be made as early as possible in labor, and we should not rest satisfied with a mere general recognition that one of the above parts is about to descend into the pelvis, but should aim at accuracy as to which extremity is presenting; or if the head, in what direction the occiput is turned. We must guard against presuming that because a given presentation existed when we last examined the patient, which may have been the day before, that the same presentation still exists. Very surprising spontaneous versions sometimes occur.

It is not clear to students just what is meant by one of the fetal parts becoming "engaged" at a given time. "Engagement" is not a definite action which begins at a certain stage and ends at another definite time and place. Between the state of absolute quiescence that precedes labor and descent of the head or other presenting parts is a series of movements of the fetus, starting with adjustment of the presenting part to the inlet, continuing with entrance into the pelvic canal and ending with passage of its widest part through the upper pelvic canal.

The axis of the uterus is not a straight line running through the middle of the fundus and internal os, but is curved with its convexity running parallel with the abdominal wall. This curve is caused by the lumbar vertebræ bowing the posterior middle part of the uterus forward and the abdominal wall pressing the fundus backward (Barnes' curve). Therefore when labor begins the fetal presenting part is pressed against the lower anterior uterine segment and the symphysis more than against the promontory.

It must, therefore, approach the inlet at an angle and undergo some curving of its parts to do so. The exception to this is in cases of relaxed abdomen where the axis of the uterus is in line with the axis of the inlet. Aside from this exception, if the approaching part of the fetus is, for example, the head in a L. O. A. position, the first adjustment of the head will be a tipping forward and downward of the part next the symphysis. That is the posterior ear will be brought nearer the posterior shoulder and the anterior ear moved away from the anterior shoulder.

The next alteration in fetal attitude is descent of the occiput, if it procedes normally. When the head has descended to such a degree that the parietal eminences are below the pelvic brim it is said to be "engaged." A more satisfactory clinical definition for "engaged" is: *When the presenting part has become so firmly established at or in the inlet that it will not spontaneously become altered.* A notable exception to this definition would be "spontaneous evolution" in shoulder presentations. The definition I have here given meets the clinical need, is a practical working definition, for it is not arbitrary, and gives room for the many variations that occur. We are not seeking to know that the parietal eminences have passed below the pelvic brim, but that the presentation is determined; that, unless we interfere, *the delivery will be accomplished according to the existing presentation.*

We will have cases of labor where the occiput presents with the os dilated to two inches, for example, and most of the amniotic fluid has drained away, with no mobility of the body or head, there being no room for fetal play, but with the occiput entering the inlet not more than a half to one inch, and yet be able to say that that occiput is more "engaged" than in another case where the occiput has entered the inlet reaching a level that brings the parietal eminences below the pelvic brim, but with abundance of amniotic fluid and mobility of the fetal body and head. The latter head is not so surely "engaged" as the former.

The period of time from the beginning of labor to the "engagement" of the presenting part is one of the most important in labor.

First, because a normal presentation and engagement is not by any means certain before that time, and second, because it affords the choicest opportunity for the physician to correct bad presentations.

There are certain conditions in some cases which, while the presentation may be perfectly normal in the ante-partum stage, suggest liability to mal-adjustment and engagement when uterine contractions begin. Thus, there may be a vertex presentation with the dorsum anterior, but the head lying very lightly above the brim, and the abdominal wall and uterus flaccid and expanded laterally, with the fundus sagged accordingly. The body of the fetus is thus allowed to lie laterally at nearly an angle of forty-five degrees to the axis of the inlet. Consequently, when the uterus contracts it presses upon the breech at an angle that may cause the vertex to slide over to one side of the brim, the shoulder to pass into the pocket of the inlet, and then under strong pains to become "engaged" in that position. Such a possibility can be foreseen in some cases, and it is the duty and indeed the pleasure of the obstetrician to arrange to see his patient at the beginning of the labor, place his hand upon the head of the fetus above the symphysis, if it proves necessary, and prevent it sliding away from the inlet. Other cases are liable to this mal-adjustment on account of contracted conjugata. I had one patient in three successive labors experience a change from a vertex presentation during the ante-partum period to a shoulder presentation and prolapse of the cord as soon as uterine pressure was applied to the breech.

The physician who accepts an engagement for confinement of a patient and tells his patient not to send for him when in labor until the pains become regular and frequent is guilty of grave neglect.

It is rare that a face presentation cannot be corrected with comparative ease if handled before impaction. Cases will occur where there is a normal condition apparently, and with the beginning of labor the amnion ruptures, a mal-presentation occurs, and impaction is accomplished all in a few minutes. Such cases do not come under the category of preventable accidents.

Diagnosis of the Presentation.—Our diagnosis is usually made as to the presentation at the inlet before we have introduced the finger into the vagina. I have found that comparatively few mistakes are made by my students in antepartum work, after daily practice for a fortnight following the system of the chart.

The same questions of diagnosis are approached from different directions, the physician's mind is kept unprejudiced "until all the evidence is in," and when he comes to the "Vaginal Examination," he knows not only that there is a vertex presentation, or a breech presentation, or a transverse, but just which way the dorsum lies, what is the angle of the fetal body to the plane of the inlet; so that if it is a shoulder presentation, the head being to the right and the dorsum anterior, he knows that it must be the left arm or shoulder that must be presenting. Or if it is a head at the inlet, but with "the cervico-occipital curve" acute, and the head in marked elevation and prominence just behind and above the pubes (see page 72) and the dorsum anterior, it is a threatened face presentation with the chin posterior.

To be obliged to make these special diagnoses by the vaginal examination, is to render their recognition often impossible until the best time for their correction has passed. But much can be learned by a vaginal examination even where we must palpate the presenting fetus only through the anterior uterine wall, if we have preceded this performance by a proper and full supra-pubic examination. A little knowledge may confirm a hesitating opinion based on other facts, that alone would leave us in the dark. A given outline of the fetal body felt through the uterine wall per vaginam, vague in itself, may so conform to a suspected attitude as made out per abdominal palpation, that an accurate and positive diagnosis can be made.

Diagnosis of the Vertex Presentation.—The diagnostics of the vertex are: its contour, hardness, convexity, the sutures, fontanelles, the scalp, which may be hairy, or formed into a caput succedaneum, and one or both ears. In general contour the vertex is larger in dimensions than the breech, which may resemble it in being spherical. In hardness, or density, the vertex is generally easily recognized as being bone, as it is

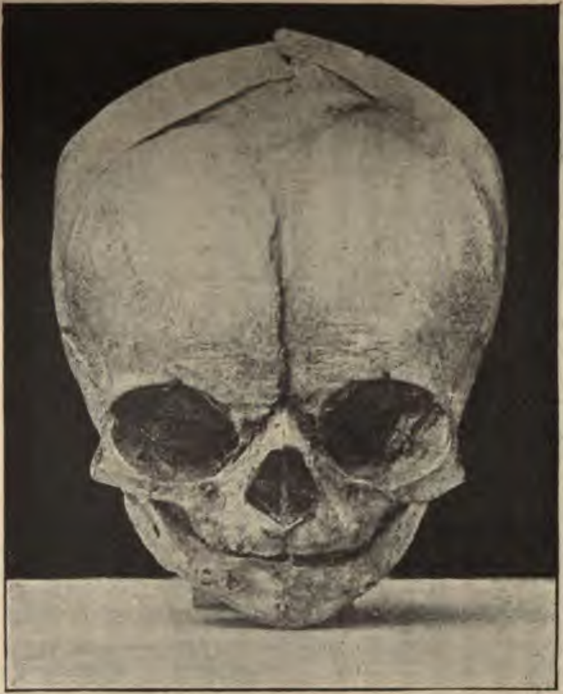


Fig. VIII. Showing fetal skull in a case of left transverse presentation of the vertex, with overlapping of the left parietal bone as result of pressure and moulding. (Varnier.)

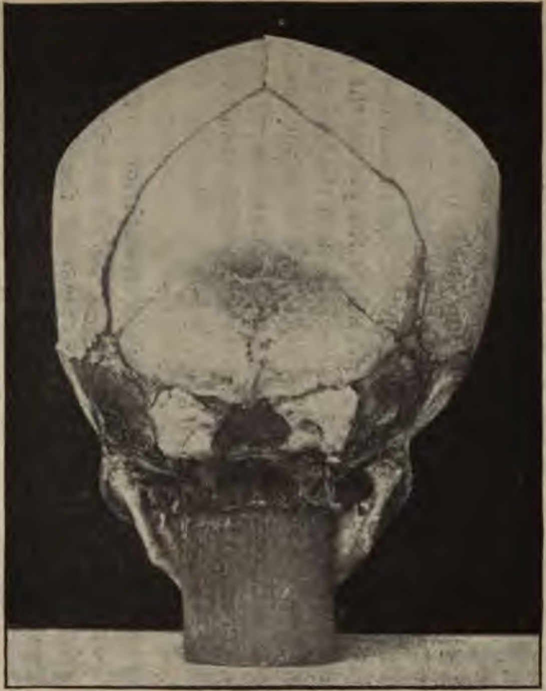


Fig. IX. Same as fig. viii, porterior view. (Varnier.)

covered only by the scalp. When we must palpate through the wall of the uterus, the cervix not being dilated, it may be difficult or impossible to determine that it is the head presenting.

The head usually lies lower in the pelvis than the breech. It fills out the intra-vaginal uterus more fully. By combined manipulation, the left fingers being in the vagina and the right hand grasping the presenting part above the pubes, the head gives a more complete outline of a sphere than the breech, and has much more "localized mobility." That is, as the result of the pivotal action in the neck, it can be moved more readily than the breech. The latter carries the entire trunk with it when moved.

Diagnosis of a Face or Chin Presentation.—The presenting part does not lie as low in the pelvis as ordinarily in an occipital presentation. The softness of the cheeks, the elastic sense in palpation of the eyeballs, the arrangement of the features, the cavity of the mouth, are usually ready means of making a diagnosis.

Where the uterus is pressing the face severely within the inlet, with more or less edema of the cheeks, there is a resemblance to the breach and may cause a "slip" in diagnosis. A face presentation recognized at the start, which is when uterine pains first begin, or recognized before it has become impacted or the amniotic fluid drained away, can usually be converted into an occipital presentation without difficulty or risk.

No better illustration of the great value of early diagnosis can be found than in just such cases of beginning face or chin presentations. Let one handle a face presentation to final delivery ever so well, saving the child, and leaving no aftermath of evil in the bladder, cervix, or perineum of the mother, his work cannot compare with that which corrects such presentations at the favorable time into a desired occipital presentation.

There are cases (I have had such) where the face cannot be converted to occiput, though taken at the most favorable time, but it can be changed to a breach presentation, which is better for mother and child than face delivery.

Should a face or chin presentation be noted early it may be changed to occipital by simply pressing against the occiput above the pubes to bring it first within the brim and down into it as far as the stage of dilatation of the cervix will permit and holding it there until enough cervical dilatation will justify rupturing the amnion and so securing impaction of the occiput. Or it may be necessary to add to subra-pubic manipulation with one hand, pressure with the fingers of the other hand in the vagina against the face to lift it up and to one side of the brim. Or we may be obliged to introduce a part or the whole of the hand within the cervix to grasp the occiput and compel chin flexion, and, of course, occipital extension. It may also be necessary to apply the forceps and make sufficient traction to get occipital impaction. We must always be prepared for conditions that prevent ordinary methods. The obstetric path is lined with abnormalities. I failed to convert one case because of a congenital loss of mobility in the cervical vetebra, delivering by breach, the abnormality being quite clearly evident when the child was born. In another case the uterine pains were so rapidly developed and so terrific in power that all the amniotic fluid was forced out and the face forced into a severe impaction within twenty minutes from the first labor pain.

Any manipulation in version that requires the return of much of the fetal body to the uterine cavity after the amniotic fluid has drained away, should be undertaken with grave caution, for uterine rupture may result, and uterine rupture is far worse, even as a risk, than malpositions. The conversion of a face or chin to an occipital presentation requires about the least return of fetal body bulk to the cavity of the uterus, but even that much may be too much to risk with no amniotic fluid preserved.

Breech Presentation.—The anus with its pucker-string sphincter and the meconium are diagnostic and only require differentiation from the mouth. The latter has the alveolar ridges to announce its character. The genital organs in the male help in the diagnosis of breech presentation. Ordinarily, of course, this condition would be recognized by abdominal palpation before a vaginal examination is made. The breech does not usually rest as low in the pelvis as the head.

Arm, r.l.; Shoulder; Foot. — Differentiation of one extremity from another may not be possible per vaginam in the first stage of labor. We have abdominal palpation and fetal heart sounds to help us in approximating a diagnosis. Thus, if we felt an extremity through the cervix or lower uterine wall, and knew by abdominal examination that the fetus lay with the head in the right iliac fossa and the dorsum to the left side of the uterus, we could feel fairly sure that the left arm was what we felt in the vagina.

For actual manipulation of a presenting extremity, either for version or delivery, it is necessary to know just which extremity it is, and what is the attitude of the body. Thus, if we are going to bring down a presenting foot or leg, we must so manipulate it that the dorsum will be forward. Careful manipulation of the hand or foot to note the shape, etc., will determine whether it is a foot or hand, and also right or left. Efforts to replace a descended extremity should be preceded by a careful study of the attitude of the entire fetal body in the uterus. It is most annoying to witness a physician blindly groping by experimentation to find a way for getting an extremity replaced, when if he knew the exact position of the child's body, he would know that but one line of manipulation would succeed.

The old-fashioned and rather widely practiced rule: "When you have a mal-presentation, find a foot and pull it down" is crude, and too much like "leading trumps" with an untrained whist player.

Prolapsus Funis.—Prolapsus funis, or the entrance of more or less of the umbilical cord into the pelvis in advance of the fetal body, is a serious accident to the child, and one that can happily often be avoided. We may be on the lookout for this in certain conditions, although it may occur in any case. The two most likely conditions in which we may foresee the accident are contracted conjugate and hydramnion. In the former the head is unable at anytime, even after pains begin, to fill the inlet. This leaves room just to the sides of the promontory, or if the head rests on one side of the inlet more than the other, at the latter side, for the cord to fall by simple gravity down to the side of the head and then below and in front of it. This may not happen until pains begin and force the head away and the shoulder into the inlet, the cord slipping down before the shoulder fills the inlet. In the hydramnion condition, there is only the slight difference in the specific gravity of the fetal body from that of the amniotic fluid to press the head or breech into the inlet; hence it rests there very lightly, and when pains begin and the amnion ruptures, there may be a great gush of waters that can carry the cord with the fluid and when the body plugs the inlet the cord is below it. Patients having conditions like these should be instructed to lie down immediately with the inception of the first pain, and remain on the back or side until the physician is satisfied that this danger is passed.

If the cord is felt before rupture of the amnion has occurred the first method undertaken to avert the threatened prolapse should be the placing of the patient in the knee-chest position and then gently make a vaginal examination and see if the cord falls away from the cervix by gravity. By letting the vagina fill with air the uterus will fall towards the diaphragm slightly, and this will aid in allowing the cord to fall to the fundus.

Recognition of a presentation of the funis before rupture of the amnion is not apt to obtain unless the finger explores the region immediately within the cervix. The cord is softer than any part of the fetal body that may present. It may require differentiation from a placenta previa. Its worm-like outline and motion when pushed, and *the pulsations* will render the diagnosis comparatively easy.

The fetus is peculiarly prone to shock and death from manipulation of the cord. Considering how much the fetus will endure of prolonged labor, pressure, distorsion and forceps compression, it is surprising how little handling of the cord will cause the death of the child.

Should the assumption of the knee-chest position fail to remove the cord, it may be best to perform external version by Wigand's method, and possibly obtain withdrawal of the cord with the change of fetal position. A breech delivery is preferable to head delivery with prolapsus funis, and, at times, to trying to replace the cord by the introduction of the hand within the uterus.

Fontanalle Presenting.—Before the value of abdominal palpation was recognized and practiced, the chief means of determining the presentation and position of the fetus was by the vaginal examination. And, if the head presented, its attitude was learned by the position of the fontanelles and sutures. Practicing abdominal palpation, it is seldom that we make the vaginal examination without having quite an accurate idea of the position of the presenting part. A knowledge of the positions of the fontanelles and sutures, is therefore, largely confirmatory. In examing very fat and fleshy women we may not be able to learn anything of fetal position by abdominal palpation, and not much by auscultation of the fetal heart sounds. Hence we must depend upon vaginal palpation for nearly all means of diagnosis.

The fontanelles cannot usually be felt through the uterine wall in the vagina, there recognition coming only when the cervix is enough dilated to admit the finger, when nothing but the amniotic sac intervenes. In occipital presentations the posterior fontanelle will be felt near the centre of the vaginal cylinder.

It is a relatively close junction of three bones, the occiput and the two parietals. There being so little size to this fontanelle that the finger can scarcely feel the purely membraneous surface, the best means of determining its location is through the elasticity or mobility of the bones, all three of which, when pressed by the finger, yield and define their edges. When the head is under severe compression this mobility is more or less wanting, and what space existed between their borders is largely lost.

This fontanelle leads to three equidistant sutures, the lamdoidal marking the junction of the two parietal bones with the occiput, and the longitudinal or sagittal the junction of the right parietal with its fellow the left parietal. The differentiation of the latter from either of the other two lies largely in the greater mobility existing in the parietal bones along their junction with one another than at their posterior junction with the occiput.

A consideration of the "hingeing" of these respective bones will show why this is so. The overlapping of the parietals under severe compression is also greater than between them and the occiput.

Given the posterior fontanelle and the sagittal suture the position of the occiput technically speaking, can be at once determined; the occiput lying in the opposite direction to that which the suture takes from the fontanelle.

The posterior fontanelle may be entirely wanting through premature ossification, or may be much larger than normal from failure of the occiput to develop. In the latter case loose Wormian bones may be felt. In cases of encephalocele, where there is a tumor bulging from the posterior of the head which is an expansion of the lateral ventricles of the brain through the posterior fontanelle, carrying brain tissue with them, the occiput is undeveloped, leaving quite a large opening between it and the parietal bones. The tension of the skin, in cases of encephalocele is usually too great for the examining finger to feel the bone opening.

We cannot hope to diagnosticate the many extraordinary fetal abnormalities that may present unless we introduce the entire hand into the uterus and carefully palpate the entire part.

The anterior fontanelle, composed of the rounded edges of the two parietal and two frontal bones, is much larger than the posterior one. It may be felt early in labor before descent of the occiput in ultimate occipital position, or in brow presentations, when it will lie near the center of the vaginal axis, or in face or chin presentations that have not become too markedly extended.

It is only fair to state here that the sutures and fontanelles as means of diagnosis of fetal head position do not hold a place of much relative importance. The diagnosis in a great majority of cases will be made by the abdominal examination; and in cases where the forceps must be applied, and for any reason abdominal palpation will not suffice for accurate knowledge of the head position, rather than apply the blades with our minds uncertain as to the position, it is better to introduce the fingers or hand far enough to map out the head, touch an ear, or feel the occipital protuberance, etc. One cannot afford to risk posterior rotation of the occiput with the forceps. Inasmuch as the forceps interfere with the normal mechanism of rotation of the occiput forwards they should be applied to the head so that when they are drawn to the maternal pelvic median line they will draw the occiput under the pubes. And if they are to be so applied, it will be seen at once that there must be no room for error as to whether the occiput lies to the right or left. I do not beleive great accuracy on this point is usually obtained where the sole reliance for diagnosis is upon the sutures and fontanelles.

"**Axis Sagittal Suture.**"—The great value of accurate diagnosis of the axis of the sagittal suture lies in the opportunity it gives for averting a posterior occipital delivery. In the larger number of cases the occiput will lie anterior to the left or right when it enters the inlet, and almost invariably result in a normal anterior rotation. Next in frequency it will lie in the transverse diameter of the pelvis, and likewise rotate forward. Yet a considerable number will lie with the occiput posterior, and fortunately most of these will rotate forward. But almost all of those that rotate backwards, resulting in posterior occipital deliveries, lie in the left or right oblique posterior at the start. Fortunately most of these will result in no special harm, inasmuch as those cases where the fetal

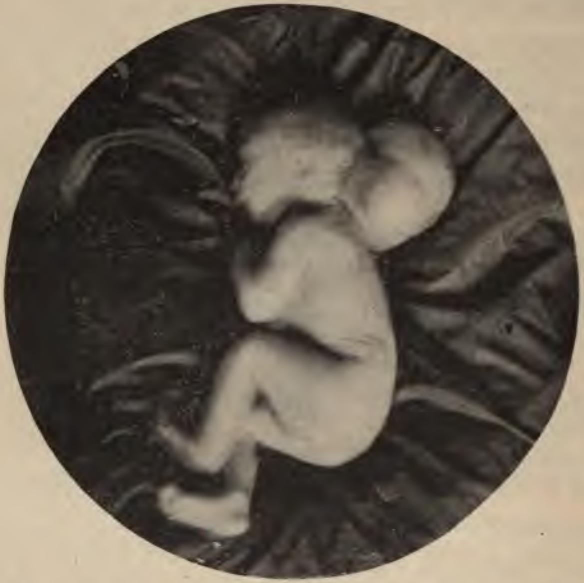


Fig. X. Fetus with encephalocele. Born alive at full term. Occipital bone was unformed at the fontanelle. The opening measuring 1¾x2⅛ inches. The tumor was mostly cerebro-spinal fluid. The lateral ventricles were much enlarged and extended into the tumor carrying the porterior corrua cerebri with them. The tumor was removed 24 hours after birth, the skin having begun to give way. Child lived 22 hours. (Author's case.)

ead is small and not therefore susceptible to the usual forces, which require a snug fit to force the occiput forward, will pass the ostium vaginae without causing lacerations; but a case of posterior occiput with large head is highly objectionable, and the chief pleasure in our work as obstetricians is in foreseeing and so avoiding such "accidents." When the fetal body is found by abdominal palpation to lie with the back posterior, and the extremities lying well forward near the median line, and the occiput, by vaginal examination found lying in the oblique posterior in the early stage of labor, we should keep close watch, making vaginal examinations much more frequently than we would otherwise desire, to note whether the occiput moves forward or not when the parietal eminence comes against the sacro-sciatic ligament in the process of descent. This is when the occiput should rotate forward, and when we should be ready to try and make it do so if it does not of its own accord.

It requires a happy judgment to properly decide the question of interference, for most cases result in forward rotation themselves, but if we wait for the question to be shown by nature before we interfere, the head may be so firmly wedged that we cannot bring the occiput forward. The time to examine is during a pain, and when the head begins to meet the obstruction to direct descent occasioned by the posterior-lateral bridge of the sacro-sciatic ligament. The means of correction, of making the occiput move forward are: the hand, passing the fingers up behind the occiput while it is yet displaceable, and drawing the occiput in a downward spiral forward, or with the forceps applied well out of the median pelvic line of the mother as near as justifiable to the parietal eminences of the fetal head and then drawing the blades downward and forward enough to secure impaction of the occiput in an oblique-anterior position, when they may be taken off.

Features: Face Presenting.—What has just been stated regarding the occiput is even more applicable to cases of face presentation. A face presentation, recognized before it becomes impacted in the pelvis, can almost always be corrected to a normal occipital position without much difficulty, certainly without grave risk to the mother. The introduction of the fingers to the nape of the neck, should bi-manual efforts fail, will be apt to prove sufficient in extending the occiput, or should that fail, internal version can be done, though such a performance must be undertaken with discretion. Many face cases only become such after the first pains of labor, there being no hint of them before. Under "Cervico-Occipital Curve," p. 402, the subject of face presentations is discussed from the stand-point of abdominal palpation, and the very means employed for its recognition by that method teach the proper manipulations for its correction. The vaginal diagnostics of this presentation have been mentioned.

"Amnion Ruptured at Spontaneously, Artificially."—There are two important and interesting questions to be considered. When shall we endeavor to delay rupture of the amnion, and when shall we rupture it? Nature cannot be said to be a safe guide.

From her standpoint the amnion ruptures in any and all conditions whenever uterine pains overcome its resistance. But Nature does not foresee a delayed labor and the need of amniotic fluid beyond normal. She does not see that in a breech presentation the chances for the child will be improved in many cases by prolongation of the first stage of labor. The most general rule that can be given is: that the amnion should be preserved from rupture in cases where either the amniotic fluid will drain away before the fetus can dispense with it, or where the cervix will be in danger of laceration because the fetus' interests demand delivery when the cervix is unsufficiently dilated, *or where uncertainty exists in the mind of the accoucheur as to the method that may later be required to complete delivery.*

In breech presentations the presenting part does not fill the uterine outlet thoroughly, which permits a larger bag of waters to form and precede the breech than in head presentations. This expansion of the presenting amnion puts it upon the stretch and causes it to rupture before the cervix is as much dilated as usual.

The latter half of a breech delivery is fraught with peril to the fetus, as the cord is in danger of being pressed upon and the fetus asphyxiated. In our efforts to avoid this we may be compelled to hasten delivery, and then find the cervix too small to permit delivery of the head. It is, therefore, a good rule to delay rupture of the amnion in breech labors until good dilatation of the cervix is secured. While the cervix dilates in proportion to the severity of the pains as a rule, yet to some extent it will soften and even dilate more thoroughly when the pains are kept in abeyance as much as possible. The patient can refrain from "bearing down," can lie still as possible on the side or back instead of walking the floor; and last, the most efficient preservation of the amnion can be had by introducing a colpeurynter or a Barnes bag into the vagina and keeping it dilated enough to act as a resisting wall to the amnion.

Whenever we may need to perform version, whether internal or external, we will want the amnion unruptured. Should there be obstruction to delivery, as in a contracted conjugate, it is most unwise to rupture the amnion, which means here that we should endeavor to preserve it, until we are well satisfied either that we will accomplish delivery shortly by forceps or version, or that we are fully prepared to do a symphysiotomy or Cæsarian section.

The mortality for mother and child is vastly increased in even the most expert hands, when the latter reach the case only to find the amniotic fluid drained away, the genital tract dry and swollen, and the fetus approaching asphyxiation.

The amnion should be ruptured when it is unnecessarily retarding labor and in no way adds risk by its rupture. The thickness and resisting power of the amnion varies much in different cases, and without any relation to the needs of the cases. In addition, the uterine and abdominal pains may be weak and fail to rupture the membrane as soon as might be. Again, there may be an excess of amniotic fluid as in hydramnion, whereby the uterus is weakened by over distension, and cannot get a good "grip" for expulsion.

Again, the amnion may be short and begin to pull on the margins of the placenta and tear it loose. It is also necessary to rupture the amnion when we are about to interfere to complete delivery, as for pelvic obstructions, concealed ante-partum hemorrhage, eclampsia, etc. It may sometimes be best to gently rupture the amnion between pains, to prevent a threatened prolapse of the cord.

The routine practice of some practitioners of rupturing the amnion simply to hurry up delivery can only be mentioned to be condemned. A physician should be held legally responsible for whatever evil results follow such practice, just as if he had given ergot for the same reason and killed the fetus.

There is a condition in some labors in which artificial rupture causes no evil and does help labor along advantageously, that is rather difficult to define on paper. It is where the head is engaged, and the cervix practically fully dilated and the pains more or less regular, but not strong, and perhaps a pint or a little more of amniotic fluid lies in advance of the head. Either the head does not press firmly against the cervix to excite good pains, or the uterus is less sensitive to excitation. Rupture of the amnion will wake up the uterus and the labor advance much more rapidly to a successful completion. This condition is the nearest approach to an excuse for the routine practice of rupturing the membrane to hurry along a labor. When properly existing it is quite a justifiable excuse for opening the flood-gates, but it is not often present.

"Fetal Progress Rapid, Medium, Slow."—The extreme of a "rapid" labor is known as a precipitate labor. Some women have given birth with but one pain. The dangers in rapid labors are: failure of the uterus to contract, causing post-partum hemorrhage, laceration of the cervix, and likewise of the perineum from too great a *vis a tergo*, the expulsive power of the uterus driving the child down before these soft parts have time to soften, relax and dilate.

Should the cervix be in danger from such cause, we can undertake to prevent the tear, either by direct pressure of the fingers against the advancing fetus in the vagina, or by the administration of chloroform or morphine. The patient herself can assist our plans by refraining from voluntary assistance to the pains to some extent.

Uterine pains may be tremendously awakened immediately following spontaneous rupture of the amnion. The writer had a patient in his charge who was walking the floor with ordinary pains in the first stage, the head being in a L. O. A., when the amnion ruptured and was followed by very strong uterine pains with the expulsion of most of the amniotic fluid. By the time she was placed upon her back for examination the presentation had changed to a shoulder with the dorsum anterior, all the amniotic fluid expelled, and the fetal chest so jammed down into the pelvis that no correction of the position was possible. The occiput was hard pressed against the sacrum and in thirty minutes from the time the amnion ruptured, the fetus was dead, and an embryotomy had to be performed to complete delivery.

The most frequent danger from rapid labors is laceration of the perineum. In primipara it is a matter of astonishment to one, even, after years of practice, that fetal heads get through the vulva without a tear in cases where the vulva does not seem to be within several inches of sufficient size when seen as the head first begins to cause it to bulge. No more interesting nor instructive working of nature can be studied than the advance and retreat of the fetal head in the process of delivery through the vulva.

So slight is the gain in the "advance" over the "retreat" each time the uterus contracts, that our sympathies for the poor mother are sorely tried; yet the perineum is slowly but surely softening and stretching, and the head is becoming more cylindrical, and after a time, when perhaps we have been roundly abused for not interfering, delivery is completed, and the perineum is still intact.

It is sometimes impossible to keep the head under proper restraint by opposing its advance with the hand. In such cases we should, if able to foresee the condition, give sufficient chloroform to get control and deliver the head as we wish.

Over-rapid labors are not as apt to occur in primiparæ as in multiparæ. There being more obstruction, the previous stages are longer and the patient too much worn out when the head reaches the perineum for the expulsion to be over-active. While the greater frequency of its occurrence in multipara is offset by the greater size of the vulva, yet the worst class of lacerations may result because of a cicatricial condition of the perineum.

"Fetal Progress Slow."—A labor is not necessarily slow because it involves many hours of time. It is slow when it causes an unreasonable interference with the ordinary functions of the mother and child, or when it develops abnormal conditions in the parts immediately involved in labor. Thus in the first class we might call a labor slow that had lasted only two or three hours, if by that time the strength of the patient had given out. The average time of labor is about fifteen hours in primiparæ and eight hours in multiparæ. To make a good beginning we must be careful to name the time when fetal progress should begin, and therefore when it may be slow. Many women are classed as in labor for many hours and even days when really not in more than light preliminary pains. I usually class a patient's labor as having begun from the time when the pains have become rythmic and as often as every fifteen minutes apart. Spontaneous rupture of the amnion may occur and not be followed for a day or two by labor pains. Generally speaking, a labor is slow in one or more stages when such stages take more than the average time, and particularly are accompanied with exhaustion, or edema, or severe head moulding, or fetal asphyxiation, etc.

"Causes of Delay: Maladjustment, Uterine Insufficiency," etc.—When the student or practitioner has acquired a masterful judgment in differentiation of the various causes of delay in labor he has become familiar with most of the phenomena of labor. He has become fitted to act as the wise counselor at the bedside.

Maladjustment.—Very few pregnants are of such capacious genital dimension as to permit the fetus to pass through the pelvis in any of the positions it might assume. Fetal pelvic transit becomes progressively harder,—following the rule,—in the following order: Occiput anterior, right or left; breech, sacrum anterior, right or left; breech, sacrum posterior, right or left; occiput posterior, right or left; face, chin anterior, right or left; dorsum transverse, anterior or posterior, right or left; shoulder, scapula anterior, right or left; shoulder, posterior, right or left; twins locked.

Many exceptions to this order will occur. It may often happen that a face presentation will result in delivery easier than will a posterior occiput, but this is not the rule. The relative smallness of the fetal head compared with the maternal pelvis is the cause of most cases of posterior occipital positions, in which delivery is not especially more difficult than in occipital anterior positions.

While distinct mal-positions are generally the cause of delay, in so far as presentation and positions are causal, yet there are often delays in engagement or descent due to special abnormalities in the shape of the pelvis of the mother, or in the body of the fetus. When, therefore, a mal-presentation is found, it should be our first effort to learn the cause. The causes of mal-position are more or less intimately united with other conditions named here as causes of delay. When delay occurs in cases of head presentation, occiput presenting, it is due to either a large head, a small pelvic inlet, a resisting cervix, insufficient pains, or over distension of the uterus. Or there may be a roomy pelvis, but its shape may be irregular; or there may be an exostosis on the brim, or a fibroid in the lower uterus, or an ovarian or kidney tumor in the way. In breech presentations the delay is due to the lesser value of the breech compared with the head as a dilator of the lower uterine segment. The breech passes into a partially dilated cervix sooner than does the occiput, and the irregularity of its form allows the amnion to slip by and carry more of the waters into the vagina. Thus, the uterus must contract down further in breech cases before the dilatation of the cervix, more particularly the part just below Bandl's ring, is well dilated, than in occipital presentations. Delays due to posterior occipital positions do not develop until the crown of the head meets the floor of the pelvis.

The rate of progress maintained up to this time will markedly lessen, and should the forceps be applied—supposing the head fits the pelvis tightly—traction will accomplish no advance. The obstruction will be absolute and bony in character. The blades will have a tendency to slip, spread the vulva and threaten the perineum without advancing the head.

In face presentations the cause of delay lies in the fact that not only the fetal head, but part of the neck and even trunk must be accommodated in the true pelvis at the same time. In cases of chin posterior the difficulty becomes more or less absolute, that is, where the chin remains posterior after descent. The chin presses into the hollow of the sacrum and the occiput is jammed against the symphysis. When the chin rotates anterior and reaches the vulvar outlet there should be no more delay than in the first position of the occiput.

In transverse presentations of the trunk delay is due to the necessity of a change of presentation before descent can take place.

The pressure of the contracting uterus must cause partial versions either of the breech to the inlet, or the shoulder or the head. The latter result is very rare. Whether the breech or shoulder will be brought to engage, will depend largely upon which part is nearest the inlet when pains make their first impression upon the fetal body. Rarely, a transverse presentation of the trunk may be forced to engage by causing the trunk to double up, forcing the iliac crest of one side first into the pelvic inlet.

Shoulder presentations are always a source of delay and, unless spontaneous evolution (to use that most stilted phrase), or artificial version follow, may result in permanent delay —death.

Locked twins cause delay because two heads cannot pass through the pelvis at the same time.

Uterine Insufficiency.—By this term is meant that the contractions are either too slow or too weak to force dilatation of a normal cervix, or descent of the fetus in a normal adjust ment and relative size of the fetus and maternal pelvis, or to both slow and weak pains.

A uterus is not classed as "insufficient" because it does not overcome abnormal obstruction. The cause of delay is then due to the abnormality. Uterine pains are too slow when labor has reached such a state of progress that a mother's strength will give out, or the life of the fetus become endangered, or the integrity of the maternal genital tissues be threatened. Pains cannot be said to be too slow in the beginning of labor until dilatation of the cervix has commenced, or the waters escaped, or the patient is prevented from keeping up her nutrition and strength. They cannot be said to be too slow when progress practically ceases when restitution of the occiput begins, if secondary head moulding must be accomplished before the occiput can move around the symphysis.

And, perhaps, we should add that, they cannot be considered too slow because the doctor has a pressing engagement elsewhere.

Clinically we would determine that the uterus is inefficient and a cause of unnecessary delay by noting the character of the pains and their infrequency, there being no real force in the contractions, and a want of rythmic regularity in their sequence. Also, by excluding any obstructive condition in the cervix, pelvis and vaginal route. When uterine pains are insufficient, the patient shows an absence of voluntary effort at expulsion, such as is invariably present in real hard pains.

Over-Distension.—When a uterus is stretched beyond normal, as in twin labors, hydramnion and large single fetuses it is apt to show lessened energy at expulsion in the earlier stage of labor.

Its muscles are placed at a disadvantage by being stretched, and their contractile power is further weakened by the anemia which almost always accompanies the condition. This latter is not especially applicable to the cases of large fetuses, as such cases are due rather to over-abundant nourishment. There is no special reason for speeding labor in these cases during the first stage, consequently nothing beyond patience is required.

Resisting Cervix.—It is not easy to differentiate between a "resisting cervix" and uterine insufficiency as a cause of delay.

The cervix dilates because of the *vis a tergo*, the pressure of the bag of waters and the fetus, and not because of direct nerve action upon the muscular fibres of the cervix causing them to relax. At least this is true in the main. The writer's personal experience has been that the cervix is at fault in very few cases.

By resisting cervix must be meant either a condition of muscular tenesmus, or connective tissue hyperplasia, or cicatricial induration as in cancer. The latter is easily recognized. A condition of tenesmus may exist, but I have not observed it.

We hear much of indurated cervix in connection with vomiting of pregnancy. It is a condition either of underdevelopment, or absence of succulence, such as develops in the middle months of gestation and which becomes greatly increased in the preliminary pains of labor. It is rarely the cause of delay in labor. The cause is elsewhere. Cervices with repaired lacerations have cicatrices, and these will take longer to soften than the normal tissue but seldom call for intervention.

Artificial dilatation of the cervix is to be done always hesitatingly, or rather reluctantly. It is hard to dilate manually and get equal and even dilatation of all parts, or without injuring the tissues and causing ecchymoses.

Moulding.—Of course "moulding" is not a cause of delay, only the herald of fetal head and pelvic disproportion. It can well be placed in the list of causes here, however, being such a readily observed condition. Moulding is not due only to bony disproportions, as it is caused by pressure against the cervix alone.

A fetal head is undergoing moulding when by palpation in the cervix we can feel that the scalp is wrinkled, or edematous, or the parietal or occipital bones have lessened spring, or overlap one another. When the bones are under pressure, the fontanelles will be reduced in size. The head is usually resting rather firmly in the inlet when moulding is going on.

Short, or Strong Amnion.—The amnion is not infrequently a cause of delay, and quite unnecessary delay in labor. At the same time the practice of rupturing it to hasten labor is so much abused, that it is well to acquire diagnostic accuracy as to the indications of its guilt. The first stage of labor may be retarded by failure of the amnion to rupture causing a condition similar to that in hydramnion, though of lesser degree. The uterus does not get, so to speak, a good grip where the amniotic fluid is abundant, as the head is prevented from pressing firmly against the cervix. This situation is best recognized where we find that a patient has been for some hours in fairly active labor, the cervix well softened and dilated to about two or three fingers width, with a good sized bag of waters lying in front of the head, and the latter not pressing firmly against the cervix, but very freely movable. The bag of waters does not help much in dilatation of the cervix after it is half dilated.

The amnion may be so short that the fetal head cannot descend without causing traction of the amnion on its placental periphery.

In such cases, unless the membrane ruptures, further descent of the head is prevented, or the placenta is pulled loose from its uterine attachment. This is one cause of birth with the amnion unruptured—the condition known as "born with a caul." The only diagnostic of a too short amnion is a blood show, the source of which is from the partially separated placenta. It is almost impossible to differentiate this blood from that which so frequently appears in the first stage and which comes from the inner lining of the cervix. The cervical blood is likely to be of a darker hue than that from the placental margin, the latter being fresh arterial and the former a stagnant and venous blood.

When a short amnion thus causes delay, it is also a strong amnion, so the two are apt to be a mutual cause.

Sometimes the amnion may be felt to be of unusual strength and thickness by direct palpation. It may also feel rough.

A Contracted Conjugate, or Other Pelvic Deformities.—If delay in labor is due to pelvic contraction, to determine just what the contraction is, and its degree is a most important necessity and duty. More wretchedly bad results follow from delayed recognition of pelvic contractions in labor, than from almost any other cause of dystocia.

The usual sequence of blunders begins, perhaps, with failure to take advantage of opportunity of making careful pelvic measurements previous to labor; then follows from impatience at the slow progress of labor, artificial rupture of the amnion—an act that should never be performed until the conditions existing are carefully determined and the proper course mapped out; then the forceps are applied to no good result, the child is injured and the waters lost; when, there being little chance of saving the child, version, or craniotomy succeed in securing delivery.

The means at our command for determining pelvic contractions at the time of labor are first, the same as in the ante-partum examination: external and internal pelvimetry, and the other elements in the equation of height and weight, age, etc., and test pressure of the fetal head into the inlet (Muller's test). Second, the additional opportunity, present only in labor, of direct palpation of the fetal head, and, if necessary, partial introduction of the fingers within the cervix and direct palpation of the pelvic inlet and the fetal head dimensions. Probably seventy-five per cent. of still births due to pelvic dystocia are avoidable, or would be, if proper diagnostic ability were general with the profession.

When the pelvic inlet is too small, or the child's head too large for engagement, the cervix will be slow to dilate and will never fully dilate; the head will continue freely movable and moulding progress very slowly, sometimes not at all. A presentation that starts as a vertex and changes to a shoulder in cases of average amount of amniotic fluid and good tonicity of the uterus and abdominal wall (see page 173), is one strongly presumptive of a contracted conjugate. A case in which we find the vertex presenting to the right or left of the inlet centre is suggestive of unilateral contraction. When the plane of the symphysis lies forward at the upper border (see page 564), it is presumptive of contraction of the pelvic outlet, and may, on careful measurement of the outlet, indicate Cæsarian section, or symphysiotomy before the head has descended to the floor of the pelvis.

Hydrocephalus.—It would presumptively seem easy to recognize the condition of hydrocephalus by abdominal palpation, but it is not so. Or at least the condition is generally overlooked at first, whether it is easy to note or not. This is to be deplored, for such a fetal condition justifies our giving our attention almost wholly to the mother. It is rather a merciful outcome of hydrocephalic cases to have the child stillborn. Certainly the mother should be saved any severe manipulation in getting the child delivered. Hydrocephalus is to be diagnosticated by the abdominal estimate in palpation of great size and by unusual mobility of the cranial bones. By cervical palpation the fontanelles should be found very large and the elevation of the head above the brim extreme. Should the fetus present by the breech and the condition of hydrocephalous not be recognized, it will be found difficult to bring the body down and out far enough to perform a craniotomy, and especially hard to deliver the arms first, should they be extended above the head. The diagnosis in such a situation must rest entirely upon abdominal palpation. Perforation of the spinal column and drainage of the cerebro-spinal fluid is the easiest operation. If delivery cannot then be accomplished, the Martin, or Braun trephine will be found the most useful instrument for perforation of the skull base.

Obstructive tumors lying in such positions as to either prevent passage of the fetal head through the pelvis, or necessitate more or less pressure of both head and tumor, are so grave a feature in parturiants as to justify careful diagnostic consideration.

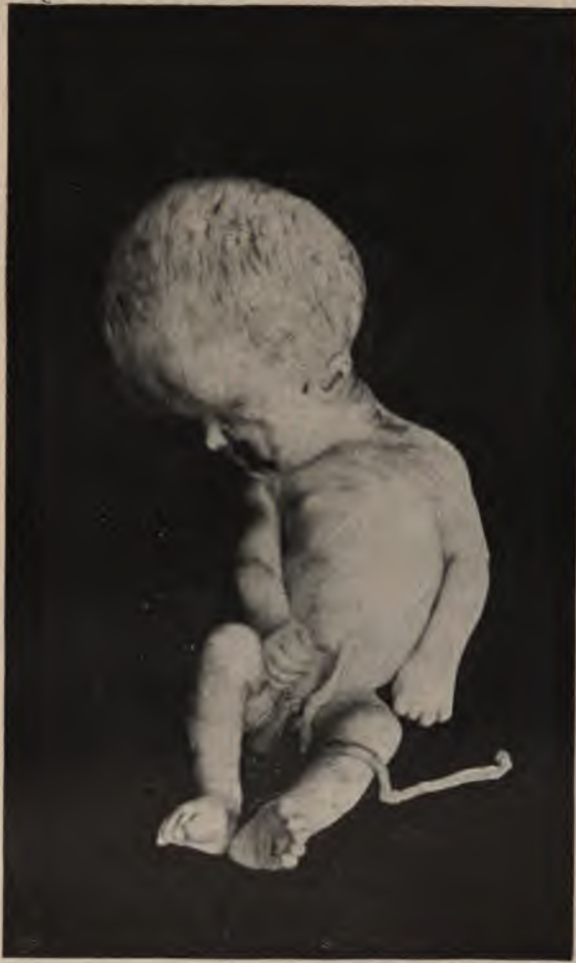


Fig. XI. Hydrocephalus. Breech presentation, sacrum anterior. Head reduced by basiotripsy, using Martin's trephine and Lusk's cephalotribe. Head, re-expanded by injection after delivery, measured 6½ inches in bi-parietal diameter and 6 e-5 inches in sub-occipito-bregmatice diameter. Child weighed 7 pounds, 8 oz. (Author's case.)

The list of such obstructions comprises tumors of the uterus, fibromata, polypi and carcinomata; of the ovaries, cytomata, sarcomata, etc.; of the kidneys, hydro-nephrosis, pyonephrosis, peri-nephritic abscesses, sarcomata and floating kidneys; of the intestines, prolapse of the small, or large intestines, carcinoma of the sigmoid flexure, or rectum and scybala in the rectum; of the appendix, abscesses; of the Fallopian tubes and the broad ligament, extra-uterine pregnancy and abscesses; of the bladder, cystocele; of the bony pelvis, exostoses of the promontory, sacrum, sacro-iliac joints, the brims of the innominata, the pubic bones and joint and, in brief, any part of the outlet.

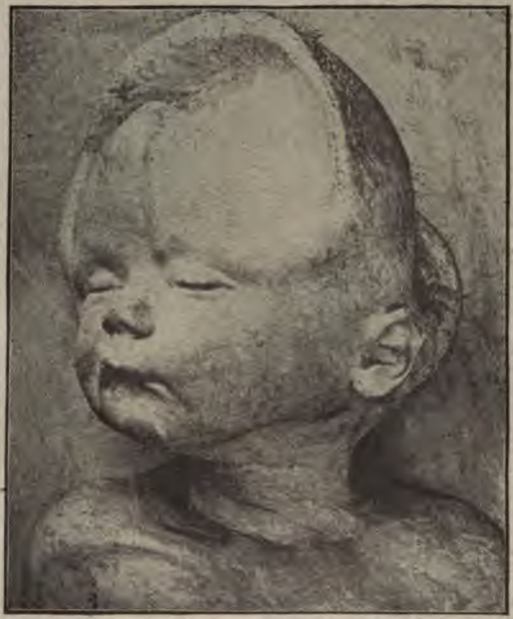


Fig. XII. Hyrocephalus, 1600 g.m.s of fluid. Female child of 4330 g.m.s. weight. Breech presentation. Evacuation by spinal canal. one-third natural size. (Varnier.)

Fibroids, cancer. or polyps of the uterus, to act as obstructions in labor, must be located in the lower, palpatable portion of that body. There need be no difficulty in recognizing the growths. They are a part of the uterus, move with it, break the unity of structure; fibroids are hard and nodular and lie within the uterine wall. Cancer destroys the regularity of the cervix, makes it hard and leathery with almost complete loss of elasticity, and produces a sero-purulent discharge. Polypi

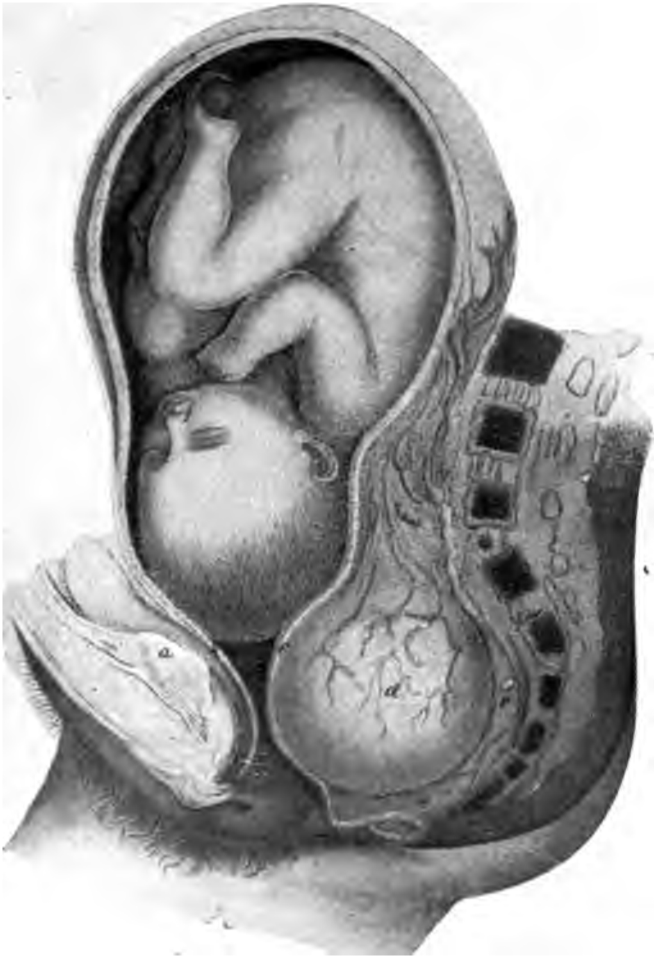


Fig. XII. Ovarion Tumor obstructing passage of the head. (Merriman.)

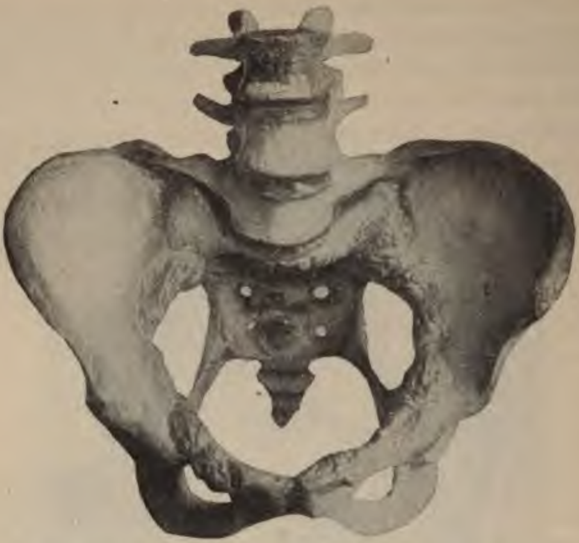


Fig. XIII. Exostoses around the pelvic brim. (Hirs

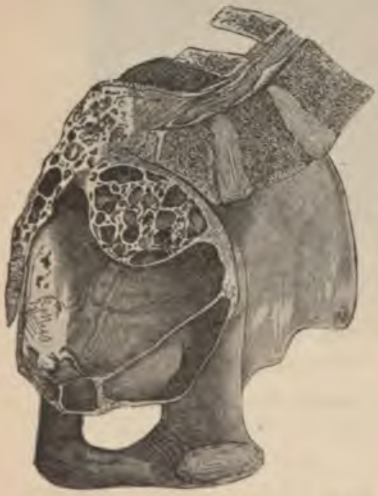


Fig. XIV. Cystic enchondroma. (Zweifel).

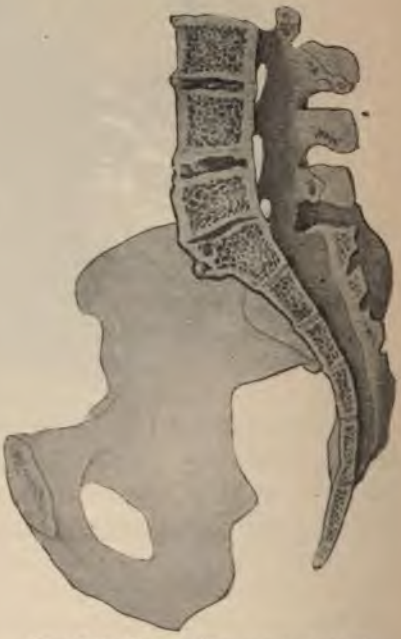


Fig. XV. Button-like exostosis on the promontory. (Schauta).

lie within the cervix, or lower segment of the uterus, and can be outlined by palpation as pedunculated smooth, rather soft tumors attached to the endometrium.

Tumors pressing down via Douglas' *cul de sac* in advance of the fetal head are difficult to diagnosticate by vaginal examination alone. An ovarian cyst, a hydro-nephrosis, a prolapsed intestine, an extra-uterine pregnancy sac may all produce similar palpatory sensations of softness, elasticity and pressure tension. Nor is it feasible to trace their origin. If the tumor is intestinal there will be symptoms due to its incarceration, peritoneal pain, vomiting, etc. If the intestines can be excluded in diagnosis it may frequently become practicable to puncture the tumor and so reduce its bulk by drainage as to permit delivery of the child. If the tumor is not liquid, and the woman is in labor, a Cæsarian section is advisable.

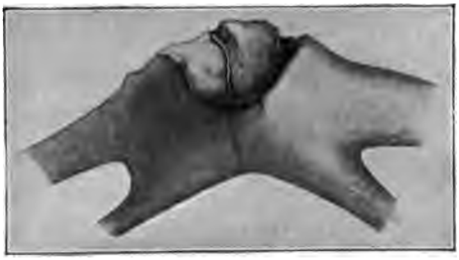


Fig. XVI. Exostoses on the symphysis. (Schanta)

In such affections of the uterus as have been just mentioned, Cæsarian section is not only indicated, but frequently complete hysterectomy.

Rectal scybala are readily recognized, but may require mechanical removal. Abscesses give a history of inflammation, and the patient has a temperature. The aspirator can determine the presence of pus. If such abscesses must be opened during labor, the sac should be thoroughly irrigated with bichloride solution, and its cavity packed with as much gauze as labor room demanded will permit.

Cystocele can be traced to the pubes as a base of attachment, and the diagnosis made by use of the catheter.

Exostoses can be recognized by their great hardness and firm attachment to the bony pelvis.

" Caput Succedaneum : Slight, Marked."—Generally, the degree of formation of the caput succedaneum indicates the aggregate of power that has been applied toward expulsion of the fetus, and the amount of resistance. The caput will be felt as a soft tumor of the scalp, placed at the part nearest the center of the cervical canal. By palpating it to its

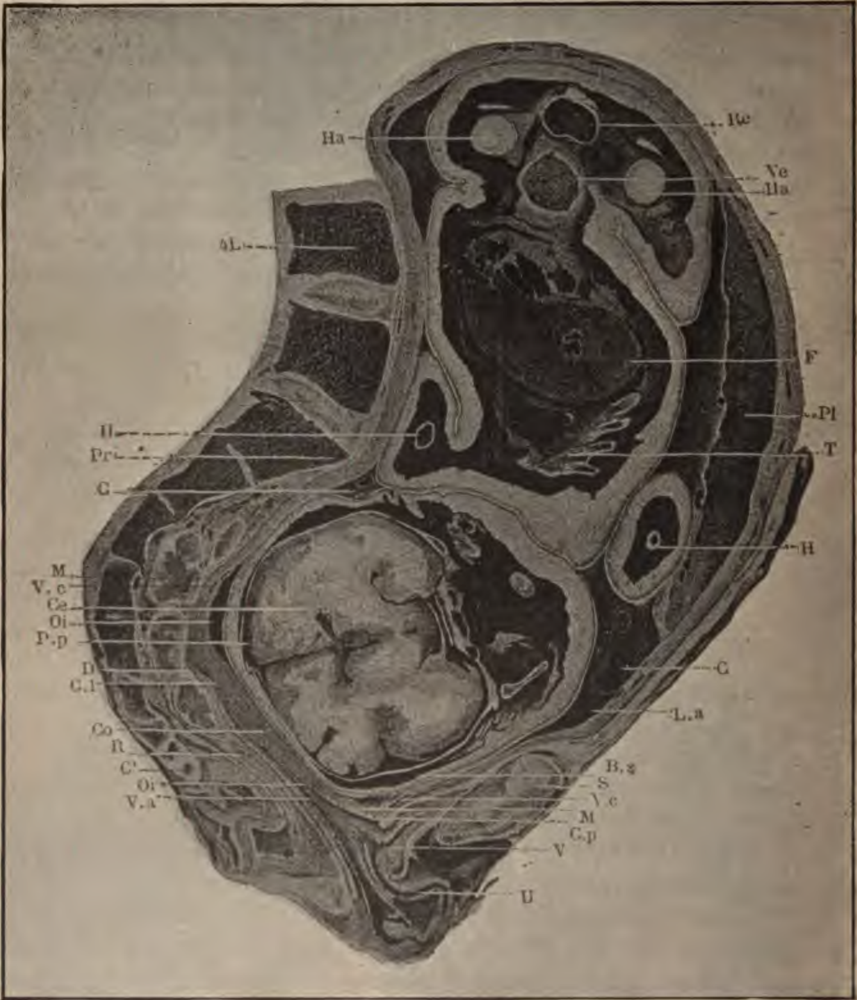


Fig. XVII. (Barbour). Sagittal section (left half) of a vi-para dead of enteritis at the beginning of labor, cervix almost completely effaced, membranes intact. Head deeply engaged in the right position, transverse variety, inclined on left anterior parietal, upon which is the sero-sanguineous boss BS.

borders, the softness will be found to merge into the usual hardness of the fetal head. Sometimes there is a wrinkling of the skin composing the caput. It may be necessary to differentiate this edematous scalp tumor from a cephalhematoma, or blood effusion under the periosteum of the skull bones—the parietal generally. The latter is more elastic than a caput

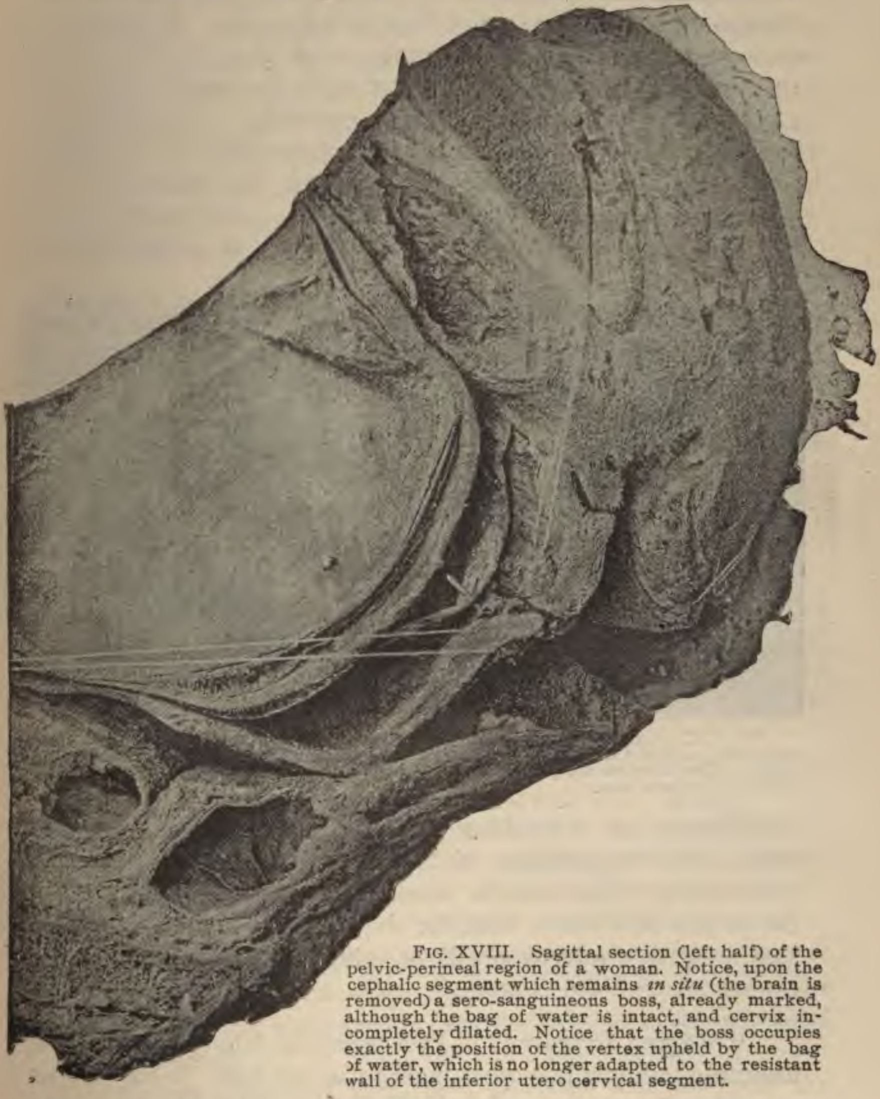


FIG. XVIII. Sagittal section (left half) of the pelvic-perineal region of a woman. Notice, upon the cephalic segment which remains *in situ* (the brain is removed) a sero-sanguineous boss, already marked, although the bag of water is intact, and cervix incompletely dilated. Notice that the boss occupies exactly the position of the vertex upheld by the bag of water, which is no longer adapted to the resistant wall of the inferior utero cervical segment.

which is an infiltration into the connective tissue of the scalp, and which, therefore, gives a "boggy" feeling. The recognition of a caput during labor is very important, as it is the most certain and prominent indicator of delay and obstruction. Its size gives the best sign of forceps indication. A caput succedaneum may be caused by pressure of the fundus against the fetal body brought into contact with the cervix only, and not the brim of the pelvis, though generally it is produced by the hard brim of the inlet. When a contraction of the uterus takes place, the part of the fetus covering the internal os is the least under pressure, and so permits a transudation of serum into the connective tissue of the scalp. A corresponding condition is that of swelling of the buttock in breech presentation. But the swelling of the arm that occurs in the latter presentation is due more to constriction and interference with the return circulation, than the simple one of equalized pressure. Further reference will be given to this subject in the chapter on "Child History."

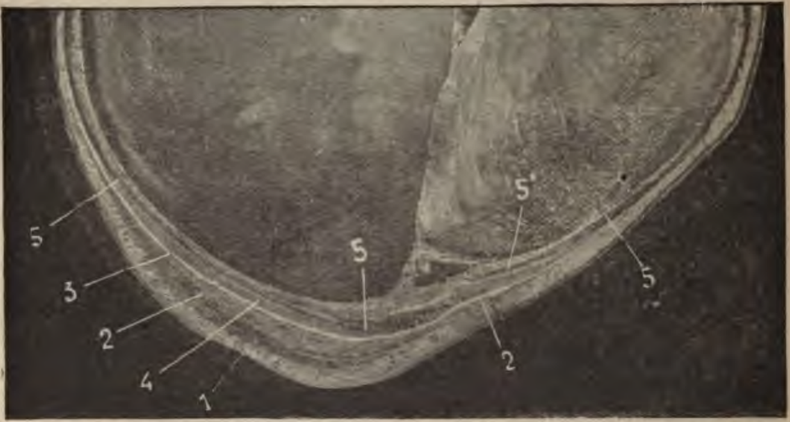


FIG. XIX. Sagittal section (left half) vertex. The cerebral substance has been removed. 1. Hairy scalp. 2. Sero-sanguineous effusion, super-periosteal. 3. Periosteum. 4. Sanguineous sub-periosteal effusion. 5 5. Posterior parietal. 5' 5'. Anterior parietal. Natural size.

"**Vagina Irrigated.**"—In a record of labor history it is desirable to know just what manipulations have been carried on within the vagina, and irrigation is of this order. Should sepsis occur, it is well to know to what to attribute its development. There has been quite a change in the attitude of the profession regarding the use of douches in pregnancy. They are not now considered desirable before labor, except in cases of known existing infection present at the time. Following delivery there should not be a fixed rule for its use. In easy labors, where there has been no introduction of the fingers or instruments within the vagina, as where the patient is seen for the first time when the fetal head is down on the floor of the perineum, there is no need of the douche, and therefore an objection to its use. For it is liable to cause sepsis, as well as prevent it. If a post-partum douche is given with strict asepsis, it is best to use it after labors that have required intravaginal palpation, and especially intrauterine palpation. The nozzle should have been sterilized, and in no way brought in contact with any possibly unclean article before it is introduced within the vagina. The labiæ should be held open when it is passed in. The douching fluid should be in an elevated fountain syringe or vessel. Hot, sterilized water is usually as good and better than antiseptics. Otherwise bi-chloride solution $1/10{,}000$ is best. The douche should not be given until the placenta has been expelled.

"**Part of Fetus Presenting on Delivery.**"—This heading, slightly modified from the original chart form, fully explains itself. By recording the actual part presenting on delivery, there will be no room for a previous error in diagnosis to escape observation; and in the case of students this is a valuable means of noting the care with which they examine their cases.

A diagnosis is not necessarily wrong made at the beginning of labor, if it, for instance, gives a head presentation, and yet is followed at birth by a shoulder presentation, for there may have been a change of fetal attitude following the application of uterine pains.

"**Right, Left Shoulder Under Pubes.**"—Following the delivery of the fetal head, rotation of the shoulders takes place, either the right or left shoulder coming underneath the sub-pubic arch.

Almost invariably the right shoulder will be next the pubes and the left next the perineum in cases of L.O.A.; or in any cases of the left occiput, provided the occiput lies next the pubes when delivered. The reverse is true in R.O.A. By noting this question of the uppermost shoulder, we have a further confirmation of the actual fetal position. One has to be a good student to write out the chart "history of labor" by guess and not convict himself. It is much easier actually to observe all points and so record them.

Rarely, chiefly in cases of posterior occiput with its rotation forward at delivery, the shoulder may rotate too far and so mislead. Or bad use of the forceps may carry the occiput too far on the opposite side, instead of to the center only, and so cause an apparent error in diagnosis.

"Occiput Restituted to (right, or left)."—When the head has passed through the vulva, if the occiput lies anteriorly, the chin first falls upon the perineum and the occiput, then "restitutes" to the side toward which it lay during its descent through the pelvis. This rotation is due to the position of the chest which is still within the pelvis. And as the dorsum will lie to the left in cases of L.O.A., L.O.T. and L.O.P., it will cause the occiput to rotate to the left, and vice versa. The occiput is apt to rotate further to one side or the other, as the case may be, in cases of the O.P., than in O.A. positions. External rotation, or restitution, is therefore diagnostic of the position actually occupied by the occiput, during the passage of the head through the pelvis.

Delivery of the Head Through the Vulva.—Considering the large proportion of cases of final delivery of the head, in which the perineum is lacerated, both in primiparæ and multiparæ with cicatricial perinei, the subject becomes of great importance, coming up as a possible factor in every labor.

In the prevention of laceration, points to bear in mind are: that rapid advance of the head through the vulva will tear a perineum, where intermittent, slow advance will not; that extension of the occiput during descent gives the smallest circumference of the head in passage; that pressure of the head against the pubic arch lessens the amount of distension of the perineum; that the attitude of the patient's body which most relaxes the perineal supports and permits the former the greatest latitude for extension is most desirable for preventing laceration; that any instrument, such as forceps, applied to the head during vulvar delivery, increases the circumference of the body unit, and therefore the stretching of the perineum; that mucidity of the soft parts assists passage of the head, and that dryness increases the tendency to tearing; that narrowing of the pubic arch increases the distension of the perineum, particularly before external flexion of the

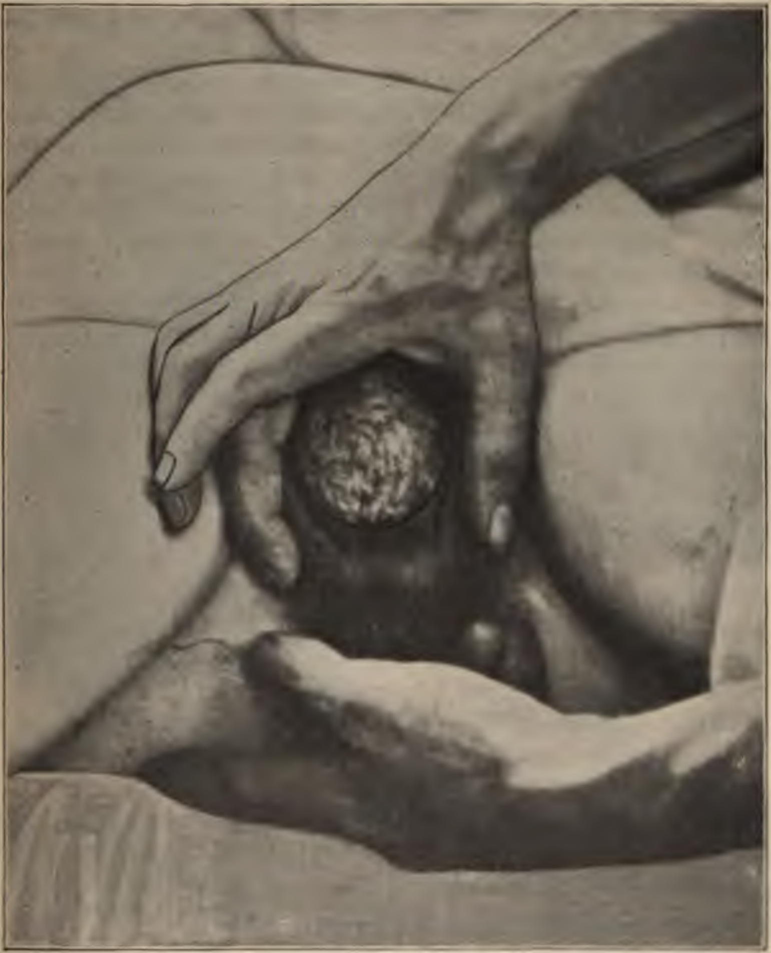


FIG. XX. Management of the perineum in delivery of the head. Thighs extended. Head pressed against the pubic arch by finger in the rectum. Right hand retarding head, and thumb and finger pressing lateral tissue to center to relieve posterior commissure.

perineorrhaphy, reference to which will appear under that subject.

Episiotomy should not be performed by a novice as its indication can only be foreseen by long experience.

In private practice one can ordinarily place the patient upon a table, as the bed may be too soft, causing the perineal region to sink deep into the mattress. When this cannot be helped, it may be better to deliver the head with the patient on her side.

"Delivered Unaided, or by Version, Forceps, etc."—A delivery is here classed as "unaided," unless version, forceps, craniotomy, or other operation is done. It does not consider such assistance as may be rendered by oxytocics, compression of the fundus, or traction of the head through the rectum.

The selection of method in aiding delivery is too broad to find a place in this work, but reference to certain diagnostics as indicators of method is imperative.

The Indications for Version.—Two general indications exist: Mal-position and Haste. In this sense any case should be classed as mal-position, which could be delivered more easily in another position. This includes otherwise normal vertex pretentations, if delivery can be better accomplished by breech presentation.

On the other hand, a mal-position might be present which might not be as desirable as some other position, but the difficulties of correction might be greater than the evils of the objectionable position.

Including the full value of version, which embraces the ante-partum period, there is no more striking evidence of the good results of ante-partum examination than what is gained by correction of mal-positions. A patient that is observed occasionally during pregnancy discloses a mal-position, which can at the proper time be corrected with no risk or discomfort, and all the evils of such mal-position entirely avoided.

Generally speaking, there is a time in pregnancy for the correction of breech, shoulder, transverse and other malpositions, when it is better and easier than if done sooner or later. That time is when the fetus is becoming fixed in its undesirable position; when, if turned by external version, it will be apt to remain in the new position. If version is done before this the fetus will move about too freely and return to its mal-position. If done before the proper time, too, it is apt to be unnecessary because most cases of other than head presentations correct themselves. The only cases in which head presentation is not desirable are placenta previa and contracted pelvis not too great to permit breech delivery, but too great for forceps delivery. There are many cases in which the mal-position is due to some special formation of womb, pelvis, or fetus, and where it will be impossible to prevent its return to the given mal-position. One of my patients had a transverse presentation in her first and second (the last), labors.

This was due to a partially bi-cornate uterus which had a two-inch septum dividing the fundus, the placenta being attached chiefly to the left upper pouch. The fetus occupied the transverse attitude, because there was not room in the longitudinal axis for its body, or not as much as in the middle horizontal axis. The body returned to the transverse, soon after being turned to a head presentation. The head was brought down to the inlet in labor, and held there until engaged. A case of face presentation was due to congenital stiffening of the cervical vertebræ of the fetus with the chin extended. Others have been shoulder presentations because of contracted conjugata vera diameters, causing the head to slide to one side. This list could be greatly extended.

In all such cases as will not remain in the position to which they are converted, the proper conduct is to turn the fetus when the patient is in labor, and the cervix partially dilated, but the amnion intact.

Version is indicated from the need of haste, or rapid delivery, in cases of hemorhage from a placental seperation at the normal site, placenta previa, eclampsia, prolapsus funis, etc. Podalic version is generally indicated in such cases.

Podalic Version in Cases of Contracted Pelvis.—Many obstetricians believe that the head can be brought through a pelvis of moderate contraction more easily by version than by forceps in many cases, and, also, when it could not be delivered by means of the forceps at all. Inasmuch as version is accompanied with some danger to the mother as well as the child, and as failure to deliver the head after the body has bee brought out makes the situation much worse, preventing practically the employment of either symphysiotomy or Cæsarian section, it becomes urgent to have a clear knowledge of the conditions in which version may be expected to do better than forceps, and particularly whether version will succeed in delivering the head.

Compression of the cranial bones with the forceps causes them to elongate the head in the perpendicular axis and not in the bi-parietal or occipito frontal diameters. It is, therefore, argued that when the head is brought to engagement in breech delivery, if the conjugata vera is contracted, the bitemporal diameter (a narrow one) will pass the promontory and symphysis, moving the bi-parietal diameter over to the right or left; that the best advantage of the mechanism of cranial bone overlapping and crown elongation is secured, and that the most desirable position of the head—the transverse occiput to the right or left—is obtained during engagement.

It is claimed that version is especially indicated in cases of flat pelvic deformity, in which the loss of space in the true conjugate diameter is accompanied with a corresponding increase in the dimensions of the inlet to the right or left. Whether these views are sound or not, it is the writer's opinion that forceps delivery is preferable whenever it can be accomplished without going to extremes, and that version should not be undertaken when forceps have failed, unless the operator is satisfied that it will succeed, or he is prepared to do a basiotripsy in case of failure to deliver the head.

It must always be remembered in high forceps application that, as there is no engagement of the head, there is little moulding, and consequently a reduction of from 3 to 12 mm. (¼ to ½ inch) in the delivery diameters of the head is possible. The chief use of the forceps in the beginning is not so much traction of the head into the inlet as moulding of the head, and, incidentally, dilatation of the cervix (never fully dilated in such cases). Intermittent and gentle compression with the forceps for from ten to fifteen minutes, rather than traction, is a good preliminary use of the instrument. Forceps are less dangerous to both mother and child than version. The risk to the mother from forceps is sepsis, gangrene of the uterus where the fetal head is made to press the uterus against the promontory or symphysis too long, and laceration of the cervix; from version the danger lies in ruptured uterus, sepsis and laceration of the cervix. For the child,—forceps may kill by compression or disfigure the head. Version may kill by shock to the heart from cord manipulation, asphyxiation from cord pressure, and delay in delivery of the head.

Indications That Version Will Succeed.—He would be a wise obstetrician who could always foretell that version will permit the head to pass when it would not by forceps traction. The chief application of the expert's skill lies not in the effort to determine that point, but in recognizing the special and peculiar conditions in which version is indicated, such as flattened pelves, inability in securing proper attitude, or position, of the head in the inlet for forceps application (lateral placenta previa, exostosis, etc.), to secure rapid delivery in eclampsia, placental separation, etc.

"Medicines Given Mother."—It is, of course, a necessary part of a labor history to record all medication. Its bearing in explaining the character of the labor, the conditions of the mother and child, the after effects, and the assistance gained in knowledge of practical therapeutics, renders this record of decided value. Regarding the more frequently used drugs, morphine, chloroform, ergot, and the various cathartics and stimulants, a few lines will not be misplaced. The indications for these articles is intimately related to diagnosis of labor conditions.

From a clinical standpoint, the first drug to consider is the cathartic. No woman should be allowed, knowingly, to enter upon labor in a constipated condition. Such condition interferes with free and effective action of the uterus, and increases the tendency to nausea, headache, systemic fever and peritonitis. The drug employed should be chosen according to the individual indications. When there is sufficient time—eight to twelve hours—and the patient is, so to speak, bilious, a condition of constipation accompanied with more or less jaundice, sluggish liver, coated tongue, poor appetite and headache, calomel in triturate form, 1½ to 2½ grains, or castor oil 1 oz., will prove most effective.

Should the time before delivery seem too brief, an ounce of sulphate of magnesium in a glassful of water should be given. The laxatives suitable during pregnancy—cascara sagrada, compound licorice powder, etc.—are not appropriate at labor time.

Cathartics are contraindicated in hemorrhage, or other conditions threatening exhaustion. Generally speaking, it is much better to secure thorough action of the bowels just before or even during labor than after delivery. Drastic cathartics and those which excite hemorrhoidal conditions should be avoided.

Of the remedies employed to act upon the uterus, sedative, antireflex and oxytocic, there is room for keen judgment and opportunity for many evils in their administration.

Sedatives. The uterus may act so violently as to endanger the cervix or perineum, or so uninterruptedly as to asphyxiate the fetus. There is a proper ratio of progress of cervical dilatation and fetal descent for every woman. It may be fast in one case and slow in another, but it should always be such a rate as will allow passage of the fetus through the cervix, vagina and vulva without laceration, if that is possible, and without, on the other hand, loss of unnecessary time. It is the special function of the skilled obstetrician to watch the speed and regulate it. It is just as bad a blunder to permit automatic rupture of the cervix through unnecessary violence of pains as it is to prematurely apply the forceps. The indications of a precipitate labor that should be retarded are: Violent pains in the first stage of labor where there is no pelvic obstruction, accompanied with high tension of the os tincæ, and a show of blood unmixed with mucus. The damage is often already done when the latter is observed. Rupture of the uterus is not often threatened where there is no obstruction, otherwise it is most liable to occur from over-action of the organ. To quiet the uterus morphine in doses from ⅛ to ⅙, or chloral hydrate, xv to xxv grains, is the most efficient. Chloral is contraindicated in any heart complication. Viburnum prunifolium is too inefficient. When the head reaches the perineum the best remedy is chloroform. Morphine or chloral is frequently employed more for the convenience of the physician than because the labor is too precipitate. They will retard labor at times for several hours. There are times when the use of these drugs for such purpose—convenience—may be proper, but only as a choice of evils. Such may be to give the physician time to reach the case. There are cases in which these drugs hasten labor. This will be further referred to.

Chloroform in Labor.—A drug used as extensively as chloroform requires special consideration. On account of its quick and comparatively transient influence, chloroform is the ideal for securing steady action of the expellent forces when the head is at the outlet. On account of its relaxing, weakening and retarding influence in complete anesthesia, or even in repeated light inhalation, it is contraindicated previous to final delivery time. If a patient is nervous, locally irritable, or hysterical, it is tempting to give a few whiffs of chloroform in the early stage of labor. But generally this drug will not lessen the units of suffering if given early in labor. It checks progress as well as pains. Usually the proper time to administer it is when the head begins to distend the vulva to a painful degree. Even here, if too much is given, or if this stage is prolonged, or rather, is going to be prolonged, over fifteen to thirty minutes, it had better be used sparingly.

Judiciously given, it saves the patient from the most painful period of labor, and gives the physician the most perfect control possible of the head in its passage through the vulva. Unless an anemic condition exists, chloroform in labor is as safe as ether. The natural conditions of pregnancy, and particularly of labor, are those most favorable to its use, heart hypertrophy and abundance of blood in the brain.

Oxytocics and Stimulants.—No oxytocic should ever be used in labor which fails to allow intermittence in uterine contractions.

Ergot, therefore, should never be used in labor, unless it be to check hemorrhage from premature separation of the placenta.

In applying a remedy for inefficient uterine action, it is very desirable to differentiate the causes. Occurring before frequent rythmic pains have begun, it is usually best to do nothing. Sometimes a distended bladder or bowels retards contraction on the principle of derivation or counter-irritation. Hyperesthesia of the cervix aborts a pain by the sudden acute-of chloral and bromide of potassium, the patients giving the usual symptoms of hysteria.

Using the word "infection" in the obstetrical sense of inoculation of some portion of the genital tract with germ-bearing material, the writer must hold to the view that quite a number of causes of rise of temperature exist in the puerperium independent of such "infection." A rise of ½ to 1½ degrees F., is not infrequent following labor; due, in my opinion, to the severe exercise of nerve and muscle and the inability of the emunctories to promptly carry off the great waste product. No more difficult problem confronts the obstetrician at the bedside than that of differentiation of genital infectious temperatures from those which are due to malaria, hysteria, constipation, "colds," breast irritation, etc.

Typhoid fever is not a rare complication of pregnancy, and may give its first indication in fever immediately following labor.

Many cases of fever after labor respond promptly to a cathartic and a good dose of quinine. The subject of infection will be considered more fully further on.

"Cervix Lacerated Slightly, Severely, Stitched."—While it is a good rule to follow to keep the fingers out of the vagina after delivery of the child and placenta, there must be exceptions.

One of these is, at times, when it becomes desirable to learn what damage has been done to the cervix. Ordinarily I would advise making no examination and leaving this question unanswered. Unless the knowledge of the damage done the cervix is to lead to treatment during the puerperium, it would be most unwise to examine it simply for records. Familiarity with the causes of laceration will often enable an experienced obstetrician to know when to expect a laceration. Prominent among these causes are: precipitate labor, manual or rubber bag dilatation, premature rupture of the amnion, incarceration of the anterior lip, forceps or breech extraction, and cicatrix from an old tear. Usually there will be a quick show of arterial blood following laceration.

It is a subject of considerable dispute whether the cervix should be stitched immediately, or left untouched. There are arguments of merit on both sides, but it seems much the better rule not to attempt repair until after the puerperium. It is true that, owing to the great abundance of lymphatics in the cervix at labor and their close relation to transmission of infection to the unreachable parts of the genital tract, there is much advantage in closing the fissure with sutures. But it is as easy to keep infection out of the vagina altogether as to shut off the lymphatics from it when it is in the vagina; in fact it is much easier. Further, immediate repair, done under unsatisfactory circumstances, is very liable to provoke infection. The larger part of cervical fissures heal without operation during the puerperium. Care should be taken in cases of severe laceration not to use a vaginal douche nozzle that will injure the cervix. It may be necessary to stitch or ligate a portion of the cervix on account of hemorrhage.

"Perineum Lacerated Slightly, Severely, Stitched."—Following delivery of the child, (usually opportunity affords, while waiting for expulsion of the placenta), the perineum should always be carefully examined and its condition determined. Should there be a laceration of ½ inch or more, a perineorrhaphy should be completed within the hour. This rule should admit of almost no exception if the physician is properly prepared to operate. The method of suturing and the suture material will vary according to the extent and variety of the laceration. In slight, superficial lacerations, which do not involve the muscular structures of the perineal floor, catgut sutures are preferable. For cases requiring fixation of tissue, en masse, silkworm gut provides a happy medium between silver wire and silk. In preparing for a perineorraphy it is necessary to get aseptic conditions under unfavorable circumstances. Boiling of instruments and sutures is the simplest means of securing sterility. Ten to fifteen minutes will be sufficient time.

Blood clots should be gently removed from the wound with cotton or gauze. Should the uterus be washing the wound with blood a tampon of gauze can be temporarily placed above the wound in the vagina to keep the perineum dry. As it is necessary almost always to introduce the finger within the rectum to pass the needle, which is both unpleasant and liable to contaminate the wound, I make use of the rectal shield, shown on page 183, to keep the finger from direct contact with the rectum. It is preferable to the finger cot as it can be slipped off when the finger is removed from the rectum, leaving the latter perfectly clean for further manipulations.

The two points to be kept carefully in mind in doing a perineorraphy are: to make sure of getting coaptation of the middle portion of the wounded surfaces when brought together, of including the torn ends of the transversus perinei muscles, and of avoiding the passage of the sutures through the rectum, which would lead to contamination of the suture tracts. Is is well to pass the needle well into the tissue in the middle portion of the sides of the tear, so that this portion will be well drawn together when the sutures are tied. There are many forms of laceration, each requiring more or less different methods of stitching. It is not the purpose of this work to compete with the textbooks in this direction. The latter should be carefully studied on this subject of perineorraphy, inasmuch as the after-health of women depends upon the efficient repair of the floor of the pelvis following lacerations in labor.

"Sphincter (torn) ."—Lacerations of the perineum, which extend through the sphincter, are quite rare, and almost always are due to careless or unintelligent management, either of the forceps, or the head, or shoulders. The forceps should never be retained on the head until it is delivered. Again, in making traction, the operator may pull without properly bracing himself against a sudden passage of the head by a given obstruction on the part of the pelvis. If the operator sits on a chair, and pulls with both hands, his balance is maintained by the forceps. If the forceps suddenly bring the head out, he has no means of support. If he will grasp the blades at the middle fenestrum with his left hand, holding the palm upward, and will rest the elbow on his knee, he can stop traction on the instant it may be required. Sphincter lacerations done in ordinary deliveries are the result of allowing the head to pass through the vulva suddenly. This is most apt to occur when the patient is applying very violent expulsive force, so that it may be almost impossible to hold back the head. In such cases, the patient should be brought under control, by means of chloroform.

These lacerations may be caused in a similar way during the delivery of the shoulders, too much effort being applied, perhaps, in drawing out one arm, or in bringing out both arms at once.

Such laceration may also be caused by breech deliveries, due in a large measure to the haste necessitated to prevent asphyxiation of the child. Immediate repair of sphincter lacerations should be an almost invariable rule. Should the bowels be much overloaded, it may be better to first get through catharsis before operating.

This would delay the operation possibly six hours, but might secure a much better chance of good union of the tissue.

" Placenta Expelled in Minutes. Spontaneously, by Manual Compression, Intrauterine Extraction : Complete, Incomplete."—There should not be a fixed rule regarding the expulsion of the placenta. Every case is a law unto itself. A good general rule to follow is to make no effort to hasten placental expulsion, so long as neither hemorrhage, nor lower uterine contraction is threatening up to twenty-five to thirty minutes after fetal delivery. The promptness with which the uterus will automatically begin contractions in the third stage, will vary with the degree of exhaustion it has undergone, the degree of activity or inertness it has shown during expulsion of the child, and the degree of anesthesia and narcotism the patient was under at the beginning of the third stage. The above exceptions permitting, therefore, we should make allowance for each case accordingly. A uterus exhausted by the effort needed to deliver the child is in a condition of paresis. If it is compelled to expel the placenta, while in this condition, it will most likely relax and bleed from the placental site afterwards. Complete rest, or gentle friction over the fundus is best for at least thirty minutes. In some labors, the uterus seems at no time to get fully into activity, it being necessary for the physician to practically withdraw the child. This condition is especially frequent in premature labors. While the liability to relaxations and bleeding after delivery of the placenta is very marked in such cases, yet there is nothing to be gained by waiting long for spontaneous delivery. Fifteen or twenty minutes is enough. Anesthesia and narcotism are apt to lessen uterine activity, and the same rule might be applied here as that just given.

The onset of hemorrhage becomes an absolute and urgent demand for uterine compression, and the amount of compression applied must be measured by the result of the hemorrhage. It must be sufficient to either stop the bleeding, or expel the placenta promptly. In placenta previa it is always best to remove the placenta promptly, and with the inserted hand if at all necessary. Hour-glass contraction, and contraction of the cervix in advance of placental expulsion is a difficult form of mal-behavior to foresee, understand and control. It sometimes follows traction on the cord done without starting placental separation. It was formerly very frequent as the result of using ergot in the second stage of labor. It may occur without any known reason. Possibly it may occur in cases of abnormally adherent placentæ, the uterus contracting where it can, which is in the lower portion.

For so useful a procedure as Credé expulsion of the placenta, it is a pity it should be so terribly abused, as it surely is. Labor is abnormal in many cases, and the uterus is thrown out of its physiological gear in consequence. This is the fundamental excuse for applying artificial assistance in expulsion of the placenta.

What has been written above is a sufficient indicator of the fact that this assistance should always be applied judiciously and according to the case. There is one very grave evil in the method of applying Credé compressions to the uterus. That is, in grasping the uterus laterally, instead of over behind and in front of the fundus. The only proper way is to place the fingers of, say the right hand, behind the fundus and the thumb in front. Then compression should be applied gradually and always gently. Lateral compression not only fails to get the best results, *but is very liable to injure the ovaries.* Furthermore, compression may be applied so severely as to cause a temporary muscular paresis of the uterus, and further hemorrhage. Care must also be taken not to force the uterus into the pelvis, instead of compressing it.

Compression should not be applied persistently, but imitating pains, intermittently. Should compression fail, it is permissible to add slight traction to the cord before applying manual extraction.

This because it is a lesser evil than extraction.

Adherent placenta occurs much more frequently in the first cases of obstetricians than after they have extended their experience.

Before using manual extraction it may be well to note the relative amount of blood in the cord after it has been ligated. In some cases it will be observed to be very much distended with blood.

It is almost always better to let out this excess of blood by recutting the cord and allowing the placenta to drain. The blood so lost does not, of course, come from the mother's circulation. In reducing somewhat the bulk of the placenta in this way, particularly when there is some contraction of the cervical part of the uterus, it becomes mechanically easier for the uterus to press the placenta through the narrowed canal. When the cord is not so distended it makes no difference whether the cord be tied or not.

In removing the placenta by introduction of the hand great care must be taken to secure asepsis and to avoid the introduction of air within the uterine cavity. The patient should always lie upon her back. An assistant should make enough traction upon the cord to put the placental tissue upon the stretch. This will serve to differentiate to the fingers introduced within the uterus placental from uterine tissue. The fingers following along the tense tissue reach the placental periphery near its fundal portion, when care should be taken to separate the placenta by pressing the outer border of the little finger between placenta and uterus. The nails should not be used, for they prevent separation and removal of the placenta *en masse*. The entire organ should be separated before the hand is withdrawn, and it should be pressed down to the os in advance of the hand. The uterus should be irrigated after such removal. It is always of great importance to learn whether the placenta is complete or not when delivered. Aside from placentæ succenturiatæ, which are present too rarely to afford the physician shelter from blame, the number of cases in which some portion of the organ is left attached to the uterine wall is grievously large. A study of Credé compression affords some explanation of this retention. Introduction of the hand to the fundus teaches us that sharp crevices may outline portions of the inner uterine wall, particularly when the latter is artificially compressed. It is quite in the range of possibility to hold that compression, particularly that which pinches up only a small portion of the fundus, may thus bite out a portion of the placenta. Every placenta should be examined when delivered to see if it is complete. To test this, evert the amnion, wash the face of the placenta and hold it in such way as will bring it to its original shape. The normal surface of separation has a pearly gray, amyloid appearance. The broken tissue is a fresher red and brown, and is easily distinguishable from the other. The fissures present are to be brought into proper relations with each one's opposing surface. If a portion of the organ is wanting it will usually be a horizontal piece and not a perpendicular one. Where a placenta is too much broken up to secure reproduction of its original formand to determine the question, it is best to explore the uterus before leaving it.

So many men have written themselves down as asses in publishing marvelous reports of cases of retained placenta for days, weeks, and even months, cases that were in their charge from the start, that one feels called upon to speak with emphasis and call such failure to remove the placenta as almost criminal. There are possibly cases in which it may be best to postpone the removal of the placenta, until reaction from shock or hemorrhage is secured.

But even these are too rare to consider. When the puerperal woman is put to bed the uterus should be empty and clean.

" **Placenta Weighed** ."—The average weight of the placenta at birth is about sixteen ounces. It is the rule for it to be of a size in proportion to the child, a large placenta accompanying a large child and vice versa. There are though, many exceptions to this, there being a somewhat similar variation in size to functional capacity as pertains to different men,—relatively greater functional capacity through greater activity and metamorphosis of tissue. Or a relatively greater per cent. of cells concerned in oxygenation and absorption, compared to mere connective tissues.

The records of 160 cases, as given in the history books of the Mothers' and Babies' Hospital, give as the average weight of the fetus at term 7 lbs., 6 oz., and of the placenta 1 lb., 4.8 oz. A ratio of 1 to 4 between placental and fetal weights is considered by Demelin as normal. But while a greater relative weight of the placenta may indicate that it is hypertrophied, it does not follow that it is physiologically abnormal, or incompetent, for there are too many cases of relatively larger placentæ with perfectly healthy children. The same holds true in cases of relatively small placentæ.

" **Abnormalities.**"—Anomalies of the placenta are very remarkable. Nor is this fact to be wondered at when we consider the wide variation that exists in normal forms in different animals. In some animals, as the tigress, it occurs as a complete band or zone, running around the uterus. In others, as the elephant, it covers the entire uterine inner surface. In woman it is discoidal and is attached to a relatively small portion of the uterine surface.

Again, it is a series of kidney shaped cotyledons, as in the cow, irregularly distributed in the uterus. Keeping these variations, shown in comparative physiology, in mind will help to explain some of the anomalies that occur in the human kind. While it is a very decided rule for one fetus to have but one placenta, there may be a secondary organ, a succenturium, which is an imitation of the cotyledonal form existing in the cow.

There may also be two placentæ (placenta duplex), three (placenta tripartita), and more (placenta multiloba). In these forms the cord subdivides within an inch or two of the placentæ, and enters the different divisions.

The special importance of a familiar knowledge of these variations lies in the danger of leaving parts of placenta in the uterus, thinking all of the organ has been removed. There are but two ways in which this dangerous oversight can be avoided. First, by making an exploratory palpation of the uterus with the hand after delivery of the placenta a proceeding which is not permissable, and which is only mentioned as a possibility. Second, by closely examining every placenta to see if there is a break in the amnion, or in a uniting band of membrane. If, for instance, the placenta is duplex and only one part is obtained, there would be a tear in the amnio-placental membrane which united the two. It will take close observation to recognize such breaks in continuity.

There are a number of variations in the outline of otherwise normal placentæ, but they have no special clinical bearing. In placenta previa the organ usually covers a relatively larger surface, and is thinner than the average. This is due to the site—the cervical part—which is less able to supply blood than the fundus.

Pathological abnormalities of the placenta are of great variety and deserving of most careful observation and study. They do not help us in the management of the given pregnancy, but may be of decided use in managing the pregnancies that may follow.

In practice we find the diagnostic ability of most practitioners very poor in bedside examinations of pathological placentæ.

It is often impossible to make a diagnosis by examination with the naked eye alone.

Calcareous Degeneration is a frequent abnormality, easily recognized and of little importance. It is a deposit of whitish, or yellowish chalky specks or flakes, composed of carbonates of lime and magnesia, and amorphous phosphates. Rarely these flakes may be so extensive as to provoke fetal death through loss of sufficient placental surface for blood supply. These salts feel gritty, and break up between the thumb and finger.

White Infarctions are composed of degenerated placental tissue of grayish-white or reddish-yellow amorphous material, generally found on the maternal surface of the organ. Usually of little importance, they may be extensive enough to cause fetal death.

Fatty Degeneration of the placenta is a term very frequently used as synonymous with the cause of fetal death. It is really a secondary process, following any change which may cut off the supply of blood to a given part. It is not denied that it may be a primary process, but we do not know this. Placental apoplexy, syphilis, and premature decay of the placental tissue may induce the process.

Placental Apoplexy, which is quite a frequent occurrence, is the rupture of the capillaries and villi, with formation of blood-clot in the meshes of the organ. The serum of this blood is absorbed, and the remainder usually becomes organized into fibrous connective tissue. It is not difficult to detect such spots, they being quite different from placental tissue.

They are just the opposite of healthy placental tissue, the characteristic of which is friability.

In proportion to the extent and frequency of recurrence of these apoplexies will the prognosis for the child be affected.

I recall a case of placental hemorrhage occurring at the eighth week, again at the fifth month, and in the eighth month the patient going to full term and being delivered of a healthy full-sized child. There was at the margin of the placenta a smooth, fibrous surface about 1½ x 2 inches, which was entirely unattached to the uterus, evidently for some time.

There had been a hemorrhage following rupture of some atrophying villi at the eighth week, when the great change in the growth and atrophy of the villi begins. Those undergoing atrophy are liable to weaken in advance of the lessening of the blood pressure, when rupture is more liable to occur.

It is next to impossible to make a diagnosis of placental apoplexy before delivery of the placenta, unless there is a show of blood.

It may be suspected from previous history, pelvic pains being present and evidence of progressive weakening of the fetus being noted.

Hypertrophy of the placenta may accompany gout, obesity, lead poisoning, endometritis, and most of all, syphilis. Demelin states that when the ratio of placental weight to fetal is more than four to one, the former is hypertrophied.

It is necessary to differentiate between true hypertrophy and edematous enlargement. In hypertrophy there is an increase in tissue formation and organization, while in edema there is simply a dropsical or watery infiltration. The latter condition is very frequent in premature death of the fetus. The placenta will be found very thick and watery when delivery takes place. This is usually from ten to fourteen days after fetal death. In syphilis,—the most important source of placental disease, because most frequent and amenable to treatment,—the lesions found are chiefly in the walls of the blood vessels, an endo- and periarteritis. There is a heaping up of cells in the intima which occlude the canal. The following from Fränkel is of value:

1. When the disease has been transmitted from the father, the principal lesion is hypertrophy of the villi.

2. When the mother is infected with syphilis, the placenta

is degenerated and the fetus diseased. The villi being filled with fatty granules, the vessels are obliterated and their epithelial covering is thickened or absent.

3. If the mother is infected during the generative act, at the same time as the ovum, syphilitic foci will often develop in the maternal placenta.

4. If the mother is syphilitic before conception, or becomes so shortly after, the placenta is syphilitic in about 50 per cent. of cases.

5. If the mother is not infected until after the seventh month of gestation, both fetus and placenta wholly escape.

6. Infection of the fetus during delivery has not been proved.

It should be stated here that the diagnosis of syphilitic infection of the placenta cannot be made from the macular appearances of the placenta alone.

Various tumors may develop in the placenta, but as they can have no bearing on therapeusis there is no benefit in discussing them in this work.

Bacteria in the placenta bring forward a subject of which little is known. The bacillus tuberculosis has been found, likewise those of the zymotic diseases and those concerned in infection in the puerperium. It has been claimed that a special germ, which is the cause of eclampsia, is found in the placenta, but this is not generally believed to be true.

"Place of Attachment."—The diagnosis of the location of the placenta in the ante-partum stage has already been considered. Here it is intended to record actual knowledge of its location as may be observed or learned in labor. The only positive knowledge of its place of attachment that we can obtain in labor results from actual palpation of the organ *in utero* by the fingers. Its site can be fairly inferred in many cases if we watch the expulsion of the placenta, and, after its delivery with the amnion, mark its relation to the rent in the amnion. Considering the former means, it is only occasionally that we will have the hand in contact with the placenta before its separation from the uterus. In placenta previa we are apt to palpate it before its removal, and may do so in version, and always when removing it by manual extraction.

To learn its site by inference from the place of emergence of the child through the amnion, it is necessary to watch the expulsion of the placenta and membranes carefully, otherwise the former may revolve during expulsion and so entirely mislead us. If the placenta, for example, is attached to the middle posterior surface of the uterus, the opening in the amnion should be within four to eight inches of the lower border of the organ. If it were attached to the center of the fundus, the opening in the amnion would be at the farthest point from the placenta. It is thus easy to see that if the opening is near the placenta, it is necessary to know that the placenta has not revolved in coming out in order to tell on which side it lay in the uterus.

"Cord History."—The facts to be noted here regarding the cord do not include the history of the part left attached to the child after severance, which goes with the child's history, but to its anatomic features—if worthy of note—and its relations to the child, such as the number of coils it makes about the child's neck, injuries it may have received, prolapse into the vagina in advance of the child, etc.

The umbilical cord is subject to very great variations in different pregnancies. Its most frequent variation is in length. Its average length is about one and a half to two feet. It has been found to measure a yard and more, and been not longer than four to six inches. The long cord is dangerous, from its liability to coil about the child's neck or become knotted. Many children have been born asphyxiated from coiling of the cord about the neck in labor.

Where the fetus has much room for moving about, there is a possibility of knots being formed which may kill the fetus by gradual constriction of the cord. The chief danger from a short cord is traction on the placenta before the child has been expelled, causing hemorrhage. There is no known method of making a diagnosis of the length of the cord before delivery, except introduction of the hand, which is not to be considered. A record of its length may explain a still-birth, as well as benefit obstetric histories. An unusually short cord may be discovered before delivery by giving signs that the placenta is being pulled upon by it. Such symptoms are: an otherwise unexplainable retardation to fetal advance, hemorrhage and beginning uterine inversion at the placental site.

It is sometimes necessary to cut the cord before delivery of the child can be accomplished. This may be the case in either short or long cords, as in the latter numerous coils about the neck shorten it too much for delivery of the child without cutting the cord.

The cord should always be kept carefully in mind in performing internal version, or in making use of the forceps. It may be so wrapt about the fetal body as to prevent the proper performance of version. It may thus necessitate a change of method of version.

It must be remembered that manipulation of the cord in version may cause fetal death, not from asphyxia, but from shock, which acts through the nervous system, apparently directly upon the heart.

There is always a liability of catching the cord between the forceps blade and the fetal head, making compression that will prove fatal. This is a very rare accident, however.

Prolapsus funis has already received consideration in this work.

Rupture of the cord has been reported a number of times, due to sudden fetal delivery while the patient is in the erect posture, or sitting at stool. The quick traction of the falling child's body tears the cord apart without separating the placenta.

"Hemorrhage in First, Second, Third Stage: Sudden, Slow, Source."—The terrible possibilities that lurk in the subject of hemorrhage in labor are the cause of more nervous apprehension to both the obstetric novice and the patient than all other subjects combined. There is a widely prevailing belief that whether severe hemorrhage will or will not occur in a given case is largely a matter of chance, or luck. This is a very grave error.

Grave because it is not true, and because hemorrhage, being very largely both foreseeable and preventable, the correct view will lead to studious effort to prevent or control it. A central placenta previa may well excite some apprehension on the part of the most experienced obstetrician, because its dangers may be greater than the best of skill can overcome;

but aside from this extreme form, it should be exceedingly rare to meet with uncontrollable hemorrhages.

The conditions which lead to uterine hemorrhage are not obscure, nor the result of Nature's whim. We know the various conditions that will decide the character and amount of blood flow from ordinary wounds; that a clean cut provokes more bleeding than a torn wound; that immersion of an open vessel in warm water will prolong bleeding; that gravity has much to do with hemorrhage from a ruptured varicose vein; that a full pulse means continued hemorrhage, while approaching syncope means thrombus formation and an end of bleeding. In hemorrhages from the uterus there are many of the same conditions as prevail in general forms, with certain variations peculiar to pregnancy.

Of these, constitutionally there are variations from ordinary conditions; first, in cardiac hypertrophy, which heightens blood pressure, and therefore the tendency to hemorrhage; and, second, a proportionate increase of fibrin in the blood of the pregnant, which increases the tendency of the blood to coagulate and so stop the flow.

Locally, we note that the prevention of hemorrhage from the placental site is accomplished by contraction of the uterine body muscle, which closes the sinuses in the uterine wall through which flows the great life current that feeds the fetus. These sinuses having no circular muscular fibers such as compose a portion of the walls of arteries, are unable in themselves to contract, but must depend upon the contraction of the entire uterine wall of the region.

It is apparent that uterine hemorrhage is, therefore, largely dependant upon the condition and action of the muscle composing the wall, or body, of the uterus. Hence, those conditions which develop weakness, or exhaustion, or paresis, or paralysis of the uterus favor hemorrhage during labor. Also, the uterus being composed of involuntary muscle which is more or less slow to awaken into vigorous activity, those conditions which cause sudden and precipitate expulsion of both fetus and placenta will increase the chances of postpartum hemorrhage.

We might add to the above certain mechanical and pathologic conditions, such as tumors, which interfere with muscular contraction, degeneration such as occur in cancer, or cystic degeneration of the chorion, traumatism, as rupture of the uterus, and accidental tearing away of the placenta, and abnormal implantations of the placenta.

Having the above points in mind one almost becomes a prophet of hemorrhage without further training.

Hemorrhage during the first stage of labor may arise from premature separation of the placenta, rupture of the uterus, or laceration of the cervix. During the second stage, in addition to these, it may arise from laceration of the vagina, bladder, perineum, and rectum, and from rupture of varicose veins. Fetal hemorrhage may follow injuries to the cord, placental body, or body of the fetus.

During the third stage hemorrhage may arise from the placental site, traumatisms, a distended bladder, blood-clots in the uterus, and as continuations of preceding stages.

It is so much better to prevent these losses of blood than to check them by the application of wonderful skill, that it becomes most important to give some space to a consideration of the conditions which favor such hemorrhages.

Weakness.—Under this heading are classed anemia, chlorosis, fevers, undue stretching of the muscular fibers (hydramnion) of the uterus, and any general condition affecting muscular tonicity, such as severe vomiting, previous hemorrhage, and eclampsia. It is not necessary to explain the relationship of blood weaknesses to uterine hemorrhage, as deficiency in the blood lessens dynamic force of all muscle. The latter may exert its fullest power for a brief time but will not endure the effort required in severe labor. Here is shown an important advantage in ante-partum examinations. Should a patient be found to possess a defective blood supply, or quality, she should be looked upon as one who must be carried through her labor without much effort by the expellant forces. If there is time before labor to remedy the condition by therapeusis, so much the better; but, otherwise, it would be proper to apply the forceps; for instance, simply to lessen uterine labor, when, if she were well, no assistance might be indicated. Various grades of hydramnion are usually accompanied by an anemic or chlorotic condition of the blood. There is probably a direct relationship between the two conditions. In addition to the blood defect there is a purely local influence which weakens the power of the uterine muscle—the stretching of the uterine fibers beyond normal conditions. The great distension of the uterus by the amniotic fluid tends to disable the muscle fibers. Women with hydramnion are liable to both delayed labor in the first and second stages and to inefficient contractions after delivery of the placenta.

Acute pernicious vomiting seldom persists to full-term labors but milder forms of vomiting may, and earlier severe forms may leave a condition which seriously affects the uterine tonicity.

Previous hemorrhage, such as may come from tuberculosis, typhoid fever, and partial premature separation of the placenta, is an acute anemia, and produces the same effect as other anemia.

Eclampsia may have occurred some time before, or rerecently, leaving the patient in a very chlorotic or anemic state.

Precipitate Labor.—The uterus is somewhat peculiar in the slowness with which it awakes to action when called upon by outside influences, or even unusual inside stimulations, such as stimulants, oxytocics, and irritants. Inefficient contractions of the uterus after expulsion of the placenta are rather the rule in accouchement forcé. Sometimes the operator in such cases performs cervical dilatation and delivery of both child and placenta without having the uterus get well into active contractions,—without, in a few cases, getting any contractions at all.

Narcosis.—The full effects of ether or chloroform increase the liability to uterine inertia in the third stage and induce post-partum hemorrhage. It is therefore generally well not to hasten but rather to delay expulsion of the placenta, to give the patient further time to recover from the anesthesia.

Prolonged Labor.—With the exception of placenta previa post-partum hemorrhage which is caused by exhaustion of the uterus, is the most serious of the various conditions here named. This is because the uterus has lost, for the time being, the power of remaining contracted for any length of time. It may contract, but has a marked tendency to relax in a moment, bleed severely, and repeat this alteration of contraction and relaxation, with increased weakness of the womb, and also of the general body of the patient.

The muscular and nerve power of the uterus—if we can separately classify them—seem to represent, like a storage battery, a definite amount of power, and when this force is expended some time is necessary to regain its power. It can readily be seen, therefore, why it becomes so difficult for the obstetrician to secure a stoppage of blood-flow, as hemorrhage returns with each successive relaxation of the uterus.

The indications of a threatened exhaustion of the uterus are not clearly seen by a novice, but should be by one experienced in confinement work. One should have a general knowledge of the average force required of the uterus in labor, and the amount possessed according to condition by different individuals. A differentiation should be made between the actual force applied by the uterus and the semblance of it as expressed in more or less hysterical pretense of effort.

Some patients give to the unitiated the appearance of putting forth tremendous expulsive effort, when most of the energy is a sham so far as the uterus is concerned.

A uterus which is becoming genuinely exhausted has already given evidence of violent and rythmic contractions for several hours.

Starting with a rythm of from fifteen to ten minute intervals it increases to one of three to five minutes time between contractions. In normal labors this latter rate should continue through to delivery of the child. In labors which exhaust the uterus pains are apt to grow less frequent or even stop entirely. Such a change occurring after labor has once gotten well under way should never be overlooked, especially if the vaginal examination finds any condition accounting for a lack of progress.

There may be no engagement of the head, or moulding is in progress, or a transverse presentation exists, or a shoulder has engaged, etc. There is a reasonable time in which cervical dilatation, head moulding, breech extension, perineal distension, and other necessary obstacles to delivery should be accomplished; and when such time has been given with a like reasonable effort by the uterus, it is time to assist.

The diagnosis of the source of hemorrhage will depend upon the period of labor. In the first stage the flow begins, if from a torn cervix, during the pain which caused it. If it is from the placental site the flow appears during the interval of pains. The former is pure arterial blood, the latter is mixed with amniotic fluid. The amount is apt to be greater when from the placental site.

Hemorrhage from a torn cervix is much more frequent in the first stage than from the placental site.

The blood show which usually accompanies the use of the forceps generally comes from the endometrium at first. Later it may arise from a laceration of the cervix.

Hemorrhage which comes from the placental site ceases during uterine contractions; from torn cervix, vagina, bladder, or perineum, it is not affected by contractions of the womb. Hemorrhage arising from rupture of the uterus can be determined only by learning of such rupture, or by symptoms of concealed and great loss of blood. Local peritoneal tenderness does not develop for some time. Hemorrhage occurring in the first stage that is not from a torn cervix is generally an indication of the existence of placenta previa. One may not be able to palpate the placenta, a large percentage of such cases being only partial, but should endeavor to do so in all cases of hemorrhage in the first stage.

" **Amount.**"—One cannot be expected to give accurately the amount of blood lost, but should estimate it, and state the times at which it appeared. The blood loss may amount to from one ounce to several quarts.

Treatment.—It will be seen from a study of the causes of postpartum hemorrhage that treatment covers the management of the labor in its several stages and the use of special methods according to each case. Generalizing, in precipitate labor, or accouchement forcé, we should delay the expulsion of the placenta in the third stage, administer ergot as soon as the placenta is expelled, and then hold the fundus until the oxytocic takes effect. In cases of constitutional weakness, in addition to a readiness to assist delivery and save the uterus as much as possible, we should administer stimulants as soon as delivery of the child is about completed, compress or hold the fundus and give ergot at the end of the third stage. In threatened hemorrhage from uterine exhaustion (prolonged labor) we must depend largely upon manual compression of the fundus for perhaps several hours, until sufficient uterine recuperation is secured to enable it to respond to ergot. In placenta previa we must depend upon direct hand and gauze tamponing of the lower uterine segment combined with fundal compression and anteflexion, keeping the patient under mild oxytocic influence for twenty-four hours.

In the management of actual hemorrhage the point of great importance is, that the physician have clearly in mind just what means are most efficient and most ready for instant use, and that these means be few and simple. When bad results follow our efforts they are mostly due to two blunders: First, letting the uterus bleed, then hurriedly compressing the fundus, then removing the band when hemorrhage has ceased, only to repeat the same error, the patient loosing blood once, twice, thrice, and again, until she is in a dangerous condition. Second, in having too many means of control, which result in confusion, successive failure, and, above all, neglect of the use of the most efficient remedies. Rather than have an array of hemostatics such as have been recommended by some of our older text-book writers—ice, hot water, vinegar, iodin, ergot, perchlorid of iron, an electric battery, etc., to be tried in turn, it is far better to get thoroughly familiar with the values of our two hands and sterile gauze. It is not the number of remedies but the method of application of the latter that secure the best results.

Let the hand hold the fundus in all suspicious cases, from the time of delivery of the placenta until restoration of the uterus has been accomplished, until reaction has followed contraction.

Let it do this, not at intervals, but uninterruptedly, not so much to compress the fundus as to stimulate it by gentle friction and to be ready for more vigorous action on the first indication of relaxation. If bleeding occurs the degree of compression should be measured solely by the results. By bringing the fingers of the other hand against the cervix compression can be made more complete without causing the uterus to be pressed downward into the vagina. By doubling the cervix and fundus forward an acute anteflexion can be secured. If bleeding still persists a long strip of 2-inch sterile gauze should be carried into the fundus, the latter being held by anyone available while this is being done. The great advantages of these remedies are that they are always ready for instant use and are so generally efficient as to justify their exclusive use over other means. In very fleshy women it is next to impossible to apply compression to the fundus. Gauze must become the chief reliance. Slapping the abdomen and thighs with a cold, wet towel is very effective, and is, like the hands, a remedy always at hand.

Cases that are classed as uncontrolable, that persist in bleeding, in which the uterus repeatedly relaxes and bleeds until death follows, are, in hospital practice, exceedingly rare. I have not known one such in some 5-6000 labors. Hemophilia almost never exists in pregnants. "Uncontrolable" cases become such probably in most of them through inefficient efforts in the beginning. When such cases arise it is not well to trust to ice, hot water, or styptics in the uterus; as these all rely upon the contractile force of the uterus, and this is practically gone. Compression of the aorta and the formation of thrombi in the sinuses of the uterus has a certain advantage, but, after all, the most reliable and prompt method of control is intrauterine packing with gauze, carried to such an extent as the cases demand.

In placenta previa the danger of a fatal result is far greater than in the above forms of hemorrhage. This is due to, first, the fact that in so many cases much loss of blood has occurred before the patient is seen by the physician; second, to the loss that occurs while the patient is in the hands of the physician and being delivered; and, third, to the anatomic conditions, whereby the usual means of checking hemorrhage by contraction of the uterine muscle are largely wanting. The cervix is weak, and made still weater by the rapid dilatation applied in most cases by the physician.

In most cases of placenta previa the abnormal location of the organ is only partial. In such cases hemorrhage usually ceases in labor as soon as the fetal head presses firmly against the cervix. Rapid dilatation of the cervix is seldom required. Rupture of the amnion may be needful to hasten impact of the head against the cervix, but otherwise the cases can be left largely to the natural progress of delivery. In central implantation, on the other hand, it is the rule that rapid or at least artificial dilatation of the cervix is necessary. It is most desirable, while this is being accomplished, to avoid all possible hemorrhage. It is best to pursue the following method: Having made all preparations for everything that may be needed up to the completion of the labor, introduce a large Barnes' bag into the cervix, holding it constantly in place with the fingers of the left hand.

The special aim should be to keep the bag constantly distended to the limit of safety for the cervix and at the same time prevent it from slipping in or out. This will take care and some skill.

But by accomplishing it well, dilatation of the cervix can be secured without the loss of practically more than an ounce of blood. It may require an hour or a little longer in primparæ and from 30 to 40 minutes in multiparæ. Having previously ascertained the exact position of the fetus, a breech being preferable, immediately on removing the Barnes' bag pass the hand either around the placenta or through it, secure the leg, bringing it down with the sacrum anterior, and into the cervix where it can be used as a tampon. The methods used in breech labors should then be pursued. As soon as the child is delivered the placenta should be removed with the hand, and the lower segment of the uterus tamponed with sterile gauze. This should be held firmly in place by the hand until the patient has been brought under the influence of ergot, and as much longer as may prove necessary. This is the most bloodless method of handling this exceedingly difficult abnormality. Ergot should be given for at least 24 hours.

Hot Saline Solution.—The introduction of the so-called "artificial serum" into obstetric work constitutes one of the most important innovations of the past twenty years. It has caused transfusion of blood to be no longer employed, and is far superior in meeting Nature's needs in severe losses of blood to any or all therapeutic remedies. The most ready and therefore serviceable method of using it is to inject the solution (1 teaspoonful of sodium chlorid to a quart of water at 105 F.) directly into the bowel with an 18-inch rubber tube, endeavoring to have it pass into the colon. The injection into the cephalic vein of the arm is more prompt and certain when accomplished, but it takes more time to get ready for this than is gained in the speed of absorption. Injections into the cellular tissue under the breasts and buttocks may also be employed. The amount of the solution to be used depends upon the results. Care must be taken in cases of severe hemorrhage that has ceased only through thrombus formation in the uterine sinuses not to over-distend the bloodvessels in direct venous injection, as this may force out the thrombi and renew the bleeding.

When bleeding persists very slowly, it is well to make an inspection of the cervix for a torn vessel.

"**Further History.**"—There are many unusual occurrences in a labor which may be well worth recording, but which cannot be specified individually in a history chart. The above blank is printed for use in such cases.

CHAPTER VII.

BREASTS.

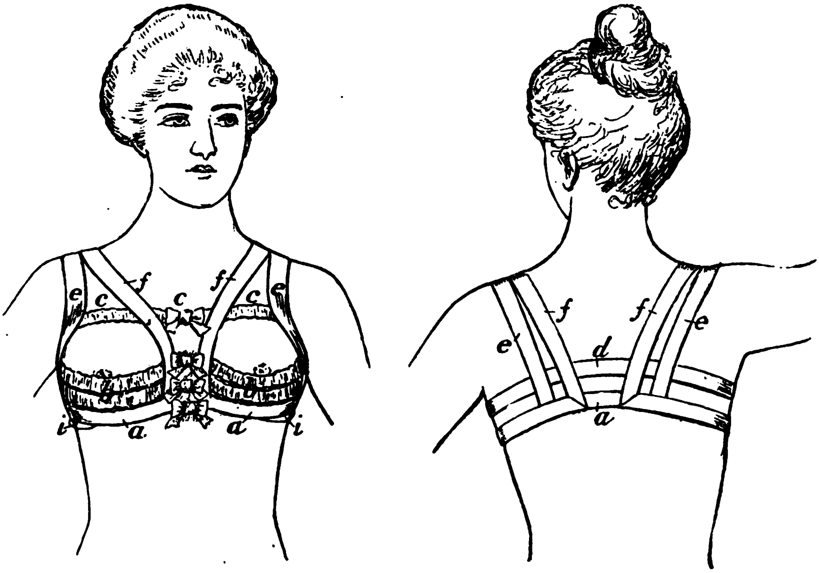
"Large, Medium, Small: Sufficient, Insufficient."—The subject of infant feeding should begin in all cases before labor. The percentage of mothers who are physically unable, whose breasts are unable, to supply sufficient milk to the children is too large to justify any carelessness in our regard for this subject. Moreover, with the great advance secured in the preparation of artificial methods of feeding by physicians and laboratory scientists, there comes a new phase to the question, that, as artificial feeding improves, the responsibility of the mother decreases. Quite a number of mothers shirk their duty in nursing because they look upon artificial feeding as almost equally safe. The cumulative hereditary dwarfing of mammary growth that must follow such unnatural disuse can clearly be foreseen. It is the duty of every mother to nurse her child from her own breasts if she is able. It is the duty of every physician to attend to the preparation of the breasts for the expected child. This subject has been considered in its antepartum phase in Chapter I. The question here of "large, medium, small" is anatomic not physiologic. A breast might be quite large and give no milk, and vice versa. The physiologic question is involved in the next headings: "Sufficient, Insufficient."

It is a very difficult, if not impossible, task for the physician to foretell the milk capacity of a breast previous to the beginning of the milk flow. It is equally difficult to say how long the supply will last. Some patients begin with an ideal amount, which unexpectedly gives out in two or three months and cannot be sustained by any measures familiar to the physician. If a patient is a multipara the behavior of the breasts in previous puerperia will be a fairly safe guide to their coming behavior, if the previous child was nursed from the breasts.

In general, the best preparation of the breasts for nursing lies in good general nourishment of the mother and the avoidance of any compression of the breasts by corsets or binders. Should the breasts begin to fill before labor, it is better to take no steps to prevent or stop the flow, but to keep the nipples dressed with fresh, clean gauze. Binding might overdo its work and dry up the secretion altogether. Should the breasts be heavy and pendulous, they should be supported from below, but not by front compression.

The question of "sufficient," or "insufficient" is not to be answered according to the size of the breasts or the quantity of the milk secreted so much as by the results to the child. Of course, it is difficult to differentiate these points, but that is the aim.

"Nipples: Elevated, Depressed, Eroded, Fissured."—The subject of the nipples is considered in Chapter I, in



BREAST SUPPORTER.

From *Gazette Medicale de Paris.*

There is girdle (*a*)which is fasted in front, just below the sternum. In front, at the upper edge of the girdle, a double pair of ribbons is fixed (*b*) to the outer straps (*e*). The mammæ are thus sufficiently supported, without being compressed. A transverse band, (*c*)unites the two outer straps (*ee*)and a band behind (*d*) is fixed to both the outer and inner straps,and also to the side straps(*i*). Two outer straps(*ee*)on the outer sides of the breasts are carried over the shoulders and attached to the girdle behind from 4 to 12 inches apart. Two inner straps (*ff*) pass from the center of the girdle in front on the inner side of each mamma across the shoulder, where each is attached to the corresponding outer strap. These then pass downwards, and are attached to the girdle over the vertebral column There are two extra supporting bands (*ii*) at the sides running from the junction of the inner and outer straps.

its antepartum aspect, and what is there stated does not need repetition here, but the additional points involved in active nursing properly belong to this chapter.

Much difficulty is experienced by mothers and nurses in securing proper breast nursing on account of the nipples. They may be too flat for the child to grasp and suckle, or too tender for the mother to endure the pain of suckling, or the child may bite too hard, or the nipples may be too inflamed, or fissured, or eroded, or infected to render nursing justifiable.

Elevated.—This is the normal nipple, and it does not matter if it is abnormally elevated.

Depressed.—This nipple is objectionable because the child may be unable to take hold of it. Two methods of successful treatment are available: to draw it out with the finger and thumb every few minutes or hours previous to the beginning milk flow, and to use a nipple-shield. The best shields for this purpose are those made of a single piece of soft rubber, which lie close and flat against the areola. They may require holding by the mother, but they pass the milk directly to the child and do not require filling with a half dram or more of milk before the child begins to receive it, which is the fault in the glass shield with rubber nipple.

Children will sometimes give up trying to nurse a breast in using the latter kind. Needless to say, any shield used should be kept perfectly clean when not in use. Boracic acid solution is satisfactory for its immersion.

Eroded.—A nipple is eroded when the epithelial cells normally covering it are desquamated sufficiently to allow serous exudation. Such desquamation may be caused before labor by the excretion of colostrum from time to time, which drying gradually forms a scab layer, under which the skin grows soft and raw; or from frequent wetting and rubbing by the child in nursing, or from milk drying upon the nipple.

Fissured.—Fissures in the nipples are not infrequently congenital, so to speak, in that they are due to malformations. More frequently they are produced in the same manner as skin cracks in chapped hands, by alternate wetting and drying; the rough chewing they receive during nursing serving to aggravate the condition. They may be the result of previous abscesses.

To remove erosions and fissures the first act is to cleanse the nipple of scabs and softened or decayed epithelium. Sterilized vaseline will soften the part to be removed, when it can then be washed off with green soap and water. A very soft brush may be needed to secure thorough scouring. The use of alcohol for hardening the nipple skin is quite popular, but should be given up. The skin is apt to crack when nursing begins. Ointments favor maceration. The best method is to wash with soap and water daily and then massage with the intention of stimulating epithelial growth in its usual physiologic way. Nitrate of silver 10 to 20 per cent strength, applied once or twice a day, is the most efficient of remedies during active nursing. The flat rubber nipple-shield should be used during nursing, when the nipple should be immediately washed with a saturated solution of boric acid and then dressed with gauze pads kept wet in this solution. Nurses and patients very frequently make the mistake at this stage of using too small pads or pieces of gauze with which to dress the nipples. These pads get displaced and the nipples lie against a chemise soiled with milk and perspiration. The pads should be at least 5 inches square.

Fissures may require abandonment of nursing, even with a shield, for a time. If they crack and bleed at each nursing it is useless to expect healing, and infection is a constant threat. It is possible to keep the fissured breast from overfilling by most gently milking it with thumb and finger, and with bandage compression for the few days needed to cure.

Eroding ulcers may require touching with solid nitrate of silver stick.

"Milk Secreted in....Hours After Labor." Forty-eight hours from the completion of delivery is the usual interval before milk secretion begins. The breasts may fill slowly, or very rapidly. The latter is, I think, more frequent. They so often fill suddenly, within three to five hours, and become over-tense, that every nurse should be instructed always to be on the alert and prepared to prevent over-distension, caking, and mastalgia. While the character of the labor may be said to affect the time of secretion, a prolonged and exhausting labor, and especially severe hemorrhage tending to delay secretion, yet the effect is not as great as one would theoretically expect.

"Abundant, Medium, Scant: Thick, Thin."—The quantity of milk in a breast cannot be determined by the size of the mamma, as dimension may be largely caused by excess of mammary tissue rather than of milk ducts filled with milk. If the size of the mammæ is observed at the time of labor and before milk secretion has begun, it will be easy to learn how much of volume after secretion is accomplished is due to the milk.

The most accurate means of estimating the amount of milk being secreted in twenty-four hours is hand-pumping of the breast for that length of time at intervals of three hours, but this is not called for in clinical work. The quantity must be estimated by direct observation and palpation of the breast, by the satisfaction rendered the child, and the time it takes to nurse. Quantity and quality are, of course, intimately united in judging from the nourishment being obtained by the child.

Quality of the Milk.—Where the means are at hand, a a scientifically accurate analysis of the various constituents of the milk can be made, and the terms, "Thick, Thin," seem crude words in comparison with the accuracy obtained. But they are intended for generalizations by the general practitioner.

Normal human milk is of a bluish-white color, more watery in appearance than cow's milk, sweeter, slightly alkaline, with a specific gravity of from 1026 to 1036. Colostrum corpuscles, which are many times larger than milk globules, are present for eight or nine days. Normal milk has the appearance of an almost clear menstruum largely filled with fat globules, varying from one to two diameters in size, and of about the dimensions of red-blood cells.

The breast from which milk is to be taken for examination should be partially emptied first. The most frequent abnormalities in milk are variations in the proportions of fat and the proteids.

Bartley (Jewett's Practice of Obstetrics), presents the subject under consideration in such satisfactory form that we take the liberty of quoting him in full:

"The following table of variations in human milk, from Rotch, is of interest in this connection:

	Normal. Normal Exercise and Food.	Poor. Starvation.	Very Rich. Generous Diet. Little Exercise.	Bad Milk. Pregnancy. Disease, etc.
Fat	4.0	1.50	5.10	0.80
Proteids	1.2	2.40	3.50	4.50
Sugar	7.0	4.00	7.50	5.00
Ash	0.2	0.09	0.25	0.09
Total Solids	12.13	7.99	16.35	10.39
Water	87.87	92.01	83.65	89.61
	100	100	100	100

When there is reason to believe that the mother's milk is not agreeing with her infant, an excess of casein should be suspected, and an analysis by a chemist may reveal the fault if it lies in the milk, and point out the way to its correction. It is advisable in all such cases to examine carefully into the mental and physical habits and characteristics of the mother.

The daily amount of milk secreted by the average mother and the weight of each feeding and of each constituent at different periods of lactation, are given in the following table from Pfeiffer:

TABLE I.

Age of Infant.	Total Amount in Grammes.	Number and Weight of Each Meal.	Proteids in Grammes.	Fat in Grammes.	Sugar in Grammes
1 month.					
½ week	104	8 X 13	4.40	2.81	4.69
1 "	254	7 X 36	8.74	6.86	11.44
2 weeks	334	7 X 48	7.64	12.13	15.05
3 "	449	7 X 68	10.27	12.13	20.23
4 "	550	7 X 71	12.58	17.86	24.78
2 months.					
5–6 weeks	749	7 X 107	13.82	22.52	41.47
7–8 "	864	7 X 123	15.83	26.40	45.03
3 months.					
9–10 weeks	926	7 X 132	17.68	20.43	55.28
11–12 "	896	7 X 128	17.10	20.25	53.50
4 months.					
13–14 weeks	966	7 X 138	19.53	39.02	59.12
15–16 "	974	7 X 139	19.62	39.23	59.39
5 months.					
17–18 weeks	996	7 X 142	17.38	52.36	......
19–20 "	996	7 X 142	17.42	52.28	......
6 months.					
21–22 weeks	1023	6 X 167	15.82	26.88	60.00
7 months.					
25–28 weeks	1051	6 X 174	15.99	34.77	60.40
8 months.					
29–32 weeks	741	6 X 124	12.15	28.69	42.80
9 months.					
33–36 weeks	482	6 X 88	7.26	11.62	28.94

The foregoing results were obtained by weighing a series of infants before and after each nursing, and adding the weights of all the feedings for the twenty-four hours. The weights of each constituent were obtained by calculation from the known composition of the milk as determined by chemical analysis. It will be noted that the quantity of milk secreted increases gradually from the beginning of lactation until about the tenth week, then remains practically stationary until the sixth month, when it increases somewhat, and finally decreases. Human milk varies considerably, both in quality and quantity, in different individuals, and even in the same individual. because of varying physiological and pathological conditions relating to food, nutrition, duration of lactation, length of time the milk remains in the breast, exercise, menstrual function, emotions, and nervous affections.

It is, therefore, very difficult to arrive at the normal com position of human milk, since these disturbing elements have not been taken into account in most of the published analyses. Analyses of human milk by different chemists differ widely, and it is difficult as yet to determine the typical normal standard. In general, it may be stated, that during the first week of lactation, colostrum is secreted, containing less fat and sugar than normal milk, more proteids (the greater part of which is lacto-globulin and lactalbumin), and more salts.

The fat and sugar rapidly increase after the eighth day till the end of the first month; from that time the proportions of these ingredients remain constant until about the eleventh month, when they fall off. The proteids and salts exist in much larger percentages in colostrum than in normal milk, the former containing on an average 2.5 to 3.5 per cent of proteids and 0.4 to 0.5 per cent of salts. Both these constituents gradually diminish until the eleventh month, when they again slightly increase. During the first month of lactation, human milk contains between 1.5 and 2.5 per cent of total proteids; during the second about 2, and in the third about 1.5 per cent.

The percentage of iron falls off as lactation proceeds, and after the eighth or ninth month it becomes decidedly less than normal. The milk of the early months of lactation, then, is characterized by a large percentage of proteids and salts, and a small percentage of sugar. That of the later months is characterized by a smaller percentage of proteids and salts, and a higher percentage of sugar. The smaller proportion of proteids and of iron in the later months contraindicates prolonged nursing. When children are nursed too long (beyond the eleventh month) they frequently show symptoms of malnutrition, and often become anemic and rachitic.

It is of interest to note that the composition of the milk varies greatly, according to the time it has remained in the breast. Forster gives the following analyses of the first, the middle, and the last portions taken from the breast during an ordinary nursing.

	First Portion.	Second Portion.	Last Portion.
Amount taken	33.1 c.c.	33.1 c.c.	37.3 c.c.
Water	90.24 per cent.	89.68 per cent.	87.50 per cent.
Proteids	1.13 "	0.94 "	0.71 "
Fat	1.70 "	2.77 "	4.51 "
Sugar	5.56 "	5.70 "	5.10 "
Ash	0.40 "	0.32 "	0.28 "

It is evident from the foregoing figures that care must be observed in obtaining a sample of milk for analysis, if we wish to secure results that are comparable or that will represent the real composition of the secretion. The middle portion only should be taken, after the child has nursed one-third of its usual time. These analyses also show that in too frequent nursing the child gets only "strippings," or over-rich milk, likely to disturb digestion."

"Further History."—The one highly important topic suggested by the above heading is mammary infection.

Mastitis.—Inflammation of one or both breasts during the lying-in period is so frequent, occurring in every 20 to 25 cases, causes so much serious trouble and is so largely preventable that the questions pertaining to the subject should be thoroughly understood.

Mastitis should be considered as always septic in origin. As in all infections, certain conditions may exist in the breasts or the body generally, which favor infection. Conspicuous among these conditions are: general anemia and local milk and blood stasis.

Anemia and chlorosis weaken the blood circulation and lessen the phagocytic power of the blood. A slow blood circulation gives more time for germs brought in contact with the tissues to breed. Uneven compression of the breasts may cause local congestion and stasis, similarly favoring germ multiplication.

While there is difference of opinion regarding milk stasis as a predisposing or causal element of sepsis, it is, most unquestionably, best clinically to consider that it does so act.

The direct sources of infection are: (1) From within through the blood, lymphatics or lacteal ducts. (2) From without through the mouths of the milk ducts in the nipples; through erosions of the nipples; through fissures, and through wounds of the breast or nipple.

The most frequent sources of external sepsis are: (1) Decomposed milk left in contact with the nipple. (2) Lochiæ, feces, etc., carried by the patient's hands. (3) Discharges from the patient and, in addition, those from the baby, purulent ophthalmia and omphalitis, carried by the nurse. (4) From the nursing infant's mouth. (5) From nipple-shields and pumps.

Of the three varieties of mastitis, subcutaneous, glandular, and sub-glandular, the second is much the most frequent and also productive of evil.

Management of the Breasts.—When a patient has been delivered, cleaned, and dressed, begin the lying-in with the use of a breast-binder, made of plain muslin, sterilized, cut to avoid the arms and neck, and applied with the ends meeting in front. Wash the nipples with boracic acid saturated solution and sterile water. Apply sterile gauze pads of about 5 inches square to the nipples and pin the bandage snugly with a series of safety-pins. Wash the child's mouth before it is applied to the breasts. Put it to the breasts every six hours on the first day, then every four hours on the second day, and every two hours after that except at night.

Wash the nipples of the mother after every nursing and so apply the gauze dressings that they will not be displaced by the restless moving about of the mother. This is not easy to accomplish, but should be much better than is generally done. Watch the breasts at the time they begin to fill and do not let them get tense. Overfilling can be prevented by child-nursing or hand-pumping. There is a very weak spot in the work of most nurses just here. You may give this order many times and not have it efficiently carried out. Forestall breast-cakeing. Keep just enough compression with the binder and emptying by child or hand to sustain even fullness and circulation. The thumb and finger are so superior to any artificial pump that they should always be used.

If the breast is painful from overfulness and perhaps with beginning inflammation, it must be emptied, even though the act bring tears to the patient's eyes. If the nurse does not know how, or is too sympathetic, to efficiently empty the breast sit down and do it for her. Several pumpings may be necessary in as many hours to secure softening and removal of cakes, when the breast should be bound tightly and evenly. Loosen the binder every two hours and gently massage the breast.

Untrained nurses and patients should be emphatically in-instructed to always wash their hands before touching the breasts.

Should abscesses develop there is but one proper treatment, prompt and thorough opening of every pocket (not easy to accomplish), and drainage. But "the ounce of prevention that is worth a pound of cure" is no where more aptly applied than in the care of the breasts in the puerperium.

CHAPTER VIII.

CHILD'S HISTORY.

"**Male, Female; Alive, Dead; Normal, Pallid, Congested; Weak, Vigorous; Asphyxiated, Cryful.**"—While mistakes have been made regarding the sex of a child, not only at birth, but in adult life, these errors have been confined to cases of true or pseudo-hermaphroditism, and such abnormalities have no bearing on the mere history record intended in the question of sex in this chart.

Alive, Dead.—It is much more important to be careful in determining whether a new-born child is alive or dead than a novice might think. Many babies have been laid aside as dead which were not, some of which have lived and some died, the latter because of the error.

A new-born child may give no evidence of life to the eye, and even fail to have its heart beats detected by palpation, and yet be resuscitatable. The surest test of life is obtained through the stethoscope applied over the region of the heart.

Normal, Pallid, Congested.—Few babies are born with their blood circulation in a normal state. Variations in the action of the heart and in the circulation are caused by ***direct shock***, handling of the cord *in utero*, and compression of the head with the forceps; by ***losses of blood to the mother***—as from rupture of the uterus—and to ***the fetus*** from placental separation; also by ***obstructions to fetal circulation***, such as occur in breech delivery, the cord being pressed upon, or the after-coming head suffering some constriction by the cervix, as in shoulder impaction; and, lastly, to constitutional conditions in mother or fetus causing asphyxiation, such as anesthesia, exhaustion, hemorrhage, and narcosis.

When a child is born suffering from any abnormality in circulation, it is most desirable to determine its kind at once and, therefore, to treat it accordingly. The usual clinical distinction in type is indicated in the terms "pallid" and "congested."

Usually the pallid stage is a sequence of the congested stage, and is much more grave in prognosis. But the congested stage does not precede it when the weakness is produced by hemorrhage or certain forms of narcosis. The pallid form shows general muscular relaxation, pale skin, weak and rapid heart-beats. A clammy perspiration would appear if the skin were cleaned and dried.

Respiratory efforts are not much different from those in the congested form.

The "congested" form is not solely a condition of excess of CO_2 in the blood, and it is a great mistake to so consider it.

Edema and mechanical stasis often complicate the asphyxiation.

In this form the child's skin is blue, or purple; the heart beats quickly—150 to 160—but more vigorously than in the pallid state, and local swelling from edema may be observed.

Weak, Vigorous.—A new-born child is not weak because it lies motionless. It may be under the influence of the anesthetic or narcotic given the mother. Weakness must be determined by the tone of the muscle, by the complexion and by the behaviour of the heart.

Cryful.—A child should cry as soon as born, as soon as its body is exposed to the air. When it does not cry it is because it is either asphyxiated, anesthetized, narcotized, or—in normal conditions—receiving such perfect blood supply from the placenta, and experiencing such slight change in temperature as not to feel any lack of oxygenation. If it lies quiet because of drugs given the mother, do not force it to cry as long as its maternal lung—the placenta—is functionating fully.

"*Resuscitated, Method.*"—Proper application of means of resuscitation requires much judgment. Some children suggest the need of resuscitation, which should be wrapped up warmly and left absolutely quiet. Such are generally those yet under the influence of drugs given the mother—ether, chloroform, morphine, etc.

Regarding the many methods advocated for restoring circulation and inducing respirations in the new-born, the writer urges the following as altogether superior in all respects: It may be termed the "sub-aqueous method." When the child is born, and while the cord is yet intact, bring a large bowl or a bath-tub filled six inches deep with hand-enduring hot water close to the mother and immerse the child in the water, holding the babe with its head, neck and shoulders resting in the palm of one hand, and its knees in the palm of the other hand.

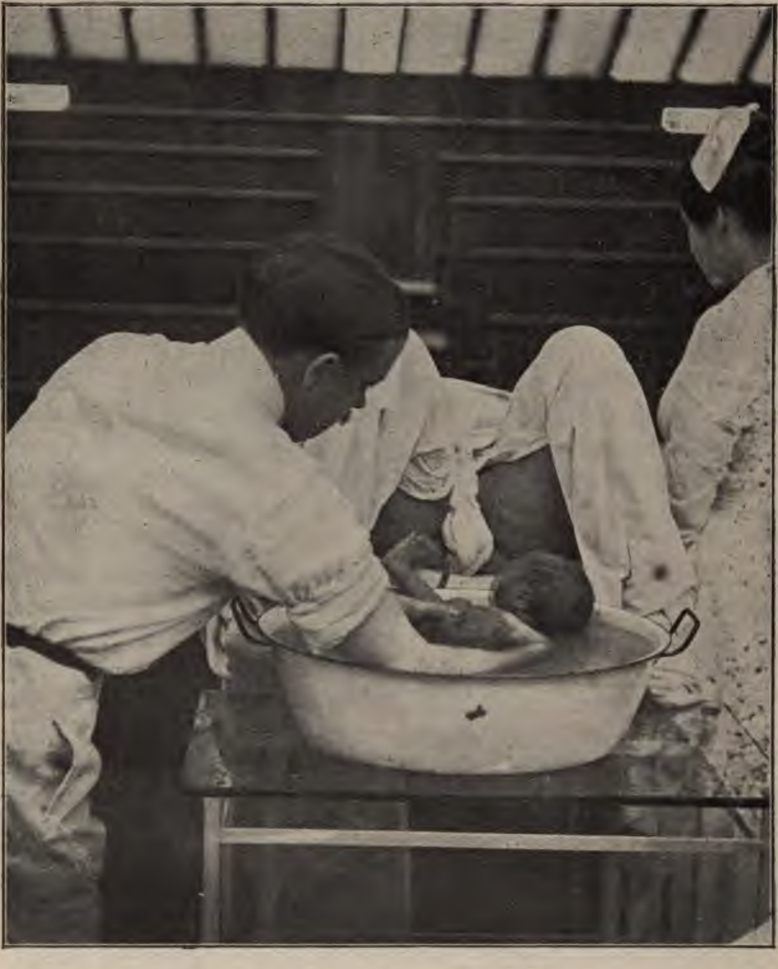


FIG. XLII.—The Subaqueous Method of Resuscitation. Compression of the Chest.

Keep the face out of the water. Keep the cord free from interference with its circulation. Do not handle it.

To expand the chest bend the entire body backwards, and to compress the chest reverse this motion.

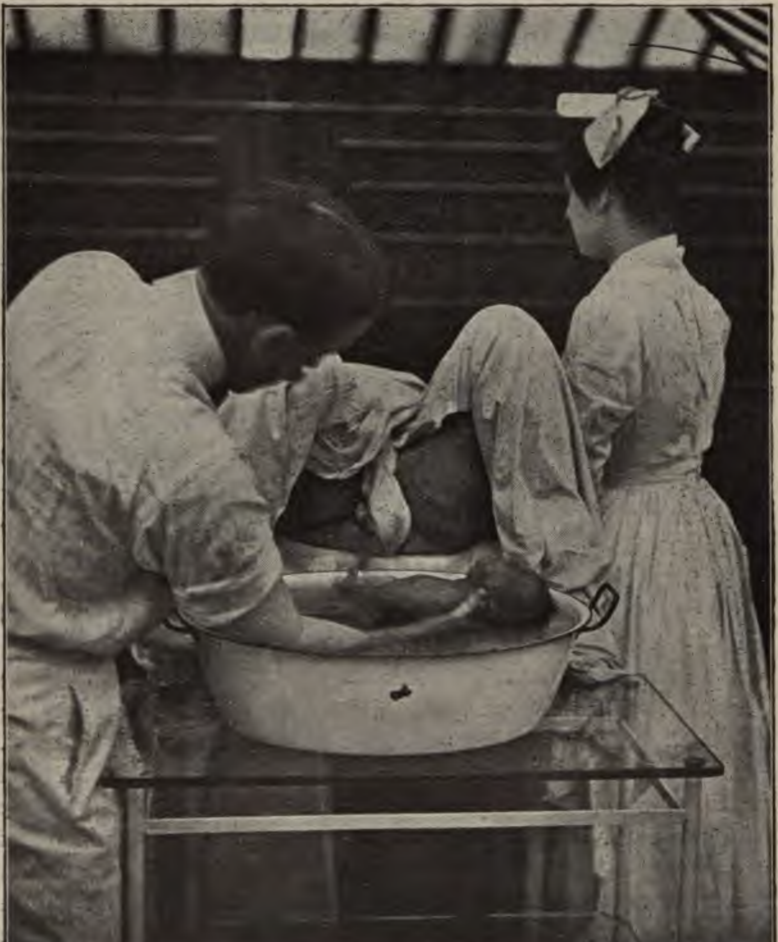


FIG. XLIV.—The Subaqueous Method of Resuscitation. Expansion of the Chest

To stimulate voluntary respiration and crying, lift the child out of the hot water and dip it into a second bowl of cold water, then immediately return it to its hot water bath, and repeat chest expansion and compression. Repeat the cold water dip after several seconds. Remove mucus from the mouth and throat with a piece of gauze on the end of the finger. An assistant can better do this.

In some cases, having inhaled mucus, it may be well to lift the child by the feet for a few seconds to let the fluid run into the mouth. Spanking is of occasional value, and, rarely, the introduction of a catheter into the bronchial tube. When cold water dipping fails to secure voluntary respiration, place a piece of gauze over the child's nose and mouth and expand the lungs by placing the mouth over the child's mouth. Regulate the force of this mouth to mouth lung inflation, aiming to do it quickly, but not to rupture the child's air vesicles. By Schultze's method the child's cord is cut promptly, the physician grasps the shoulders, holding the body face forward, and swings it forward and upward until the limbs and pelvis fall by gravity upon the chest and compress it. Swinging the body back again the chest is expanded. While this method is undoubtedly effective in expanding the chest and in stimulating the respiratory center by exposure of the skin to the air, it is so unnecessarily severe and sacrifices so many important features the writer thinks it should be abandoned. Animal heat in the new-born will be lost very rapidly in one that is asphyxiated. The sub-aqueous method preserves animal heat as long as needed. This method secures as good chest expansion and compression as Schultze's.

It does not require severance of the cord and gets the benefit of continued placental circulation. The cold water dip gives full skin stimulation without causing loss of animal heat. The hot water bath is especially useful in the semi-narcotized and in the pallid classes. When the child is first immersed in the hot water bath its skin will turn blue, due to dilatation and temporary blood stasis in the capilliaries. It is of no importance other than that it be understood. Traction of the child's tongue will sometimes stimulate respirations, also slapping of the buttocks. The pallid child may need a drop or two of whiskey or brandy.

"Cord Tied Before, After Lung Expansion."—It is of unquestionable advantage to the child to have the cord tied only after expansion of the lungs has occurred. Experiments by Budin and others have demonstrated that the actual blood-carrying capacity is increased by the expansion of the lungs with air from 2 to 3 ounces. Inasmuch as the child must exist for about forty-eight hours after birth without any nourishment, it becomes of decided importance to give it this excess of blood, which may be considered as so much elaborated food.

Atelectasis is not as easily overcome through crying as is generally believed. Holt and others have made clear the fact that many infants supposed to have fully dilated their lungs were found in post-mortem observation to have only the upper lobes distended.

Only when a child has cried hard enough to cause its face to grow quite red, hard enough to put the air in the lungs under compression, should it be considered as safely freed from atelectasis.

Ligation of the Cord.—The best ligature is 1/16 inch wide sterilized tape. This tape should be kept in a closed bottle filled with boracic acid saturated solution. Antisepsis is of great importance in treatment of the cord, inasmuch as umbilical sepsis is a very frequent and fatal affection. Many babies have died from this, in whom the true cause was not in the least suspected. The cord should be gently squeezed, or milked, towards the abdomen before tying the ligature, to avoid including a possible hernial protrusion of gut and its inclusion in the ligatured stump.

The tape ligatures should be 1 foot long to enable one to make sufficient traction to cut through Wharton's jelly. Unless the ligature is tied tight enough to do this it may get loose through shrinking of this jelly and permit hemorrhage. Here, likewise, lies many a cause of infant death.

Ligation of the Placental End of the Cord.—It may or may not be best to tie this end of the cord. The blood lost involves no loss to the mother, so it is simply a question of the effect on delivery of the placenta. I make it a rule to let the cord bleed when it is much distended with blood just before it is severed, believing that this is a sign of placental fullness. A certain amount of stiffness in the placental body is an assistance in its expulsion by the uterus, but, inasmuch as so many uteri partially close in the lower segment before the placenta has come away it is better to render the placenta as small as possible by letting the blood drain out of it.

Cutting the Cord.—Gather the cord in the palm of the hand and cut it a half inch from the ligature with some short, blunt scissors. In this way the possibility of unexpectedly trimming off a toe, or, if a male, a bit of foreskin can be surely avoided, and the blood, which often squirts out, will not fly into one's face.

Dissection of the Cord.—Dickinson favors complete dissection and exsection of the cord and closure of the skin over the stump.

The justifiable surgical principle involved in this is, that perfect surgical technique renders the danger from sepsis by dissection and removal of the dead cord tissue inappreciable, while the old method must take a risk in allowing the stump to remain. One cannot guarantee the work of the nurse in the five days of stump presence, but can his own work. Possibly, in a large number of cases, Dickinson's method would give the most perfect results in the hands of first-class obstetricians, but if generally applied, I am strongly of the opinion that it would cause more sepsis than the older method through poor technique.

Dressing of the Cord.—A sensible precaution is to burn the raw ends of the stump with nitric acid or the actual cautery, though this is often omitted. The cord-stump being about 1½ inches long, it should be well dusted with a powder composed of equal parts of bismuth and boracic acid and wrapped with a 5-inch pad of sterilized gauze which has been split from one side to the center and then bound tightly to the abdomen with the customary binder. In this method of dressing the stump, the special object should be to keep it absolutely free from any moisture.

Kusmin (*Ctlb. f. Gyn.*, 1899, No. 10) ligates the cord with a rubber ring slipped over the stump with a specially devised instrument and then dresses the stump with a Plaster of Paris bandage.

Ahlfeld (*Monats. f. u. Gyn.*, July, 1899) claims ideal results by first ligating the cord 3¼ inches from the abdomen, then washes the stump with kresol soap (3 per cent), then religates the stump ¾ of an inch from the abdomen and saturates the stump and neighboring region with 96 per cent alcohol and applies sterilized cotton with a roller bandage. He claims getting ideal results.

"**Caput Succedaneum.**"—The child's head should always be carefully examined after delivery, not only for its own sake, but to record such data as materially bear upon the question of dystocia in future labors. The degree of formation of a caput succedaneum is a measure of the amount of moulding that has taken place, modified by the fact that inefficient pains increase the size of the caput independently of the degree of pelvic obstruction.

"**Location.**"—By recording the exact location of the caput, the actual position of the head during labor, particularly in the first stage, is determined. This point becomes, therefore, a gauge of skill in diagnosis of position. The caput is not absolutely reliable in this respect, as in some marked distortions of the pelvic inlet the location may be altered. When formed the caput will be upon the right parietal eminence in cases of L.O.A., being near the center in L.O.T. and still more so in L.O.P. The same holds good reversed in occiput to the right. The rule generally expressed is that the caput forms at that part which lies nearest the axis of the inlet and cervix combined.

Cephalhematoma, which is an effusion of blood between the bone (parietal generally) and its periosteum, may be mistakenly considered a caput.

This blood tumor forms after birth, while the caput always forms during labor. The former is always limited to the bone from which it arises, the union of the periosteum at the bone peripheries being too strong for the blood pressure to separate it.

The caput is doughy or boggy, while the cephalhematoma is cystic and elastic on palpation.

"**Head Moulded, Slightly, Severely.**"—To know that the head has moulded, where it is in very slight degree, one must have some knowledge of the shape of the normal unmoulded head. Slight moulding occurs in a large per cent of labors. Severe moulding is best indicated by stating the limits of moulding. A head may be compressed sufficiently to reduce the circumferential measurement at the planes of the sub-occipito-bregmatic and bi-parietal diameters 1½ inches. That is a reduction of ½ inch in direct diameters. Such heads in anterior occiput have a long cocoanut shape with the parietal bones overlapping and the foramina much reduced.

"**Injuries.**"—The injuries most likely to follow the difficulties of labors are, of those not involving the physician: cephalhematoma, intra-cranial hemorrhage, and moulding with caput formation; and of those due to the physician, over-compression of the bones by forceps, fracture of the same, deep indentations of the scalp, cutting of the scalp, injuries to the eyes, to the lips from pressure with the finger in traction against the upper alveolar ridge, laceration of the ear, and fracture or dislocation of the lower jaw.

"**Pulse at Birth, in Twenty-four Hours.**"—Wide variations in the infant pulse occur after delivery. The relatively slow pulse rate (120–135) is a more favorable one than that which runs above 135. A very slow rate accompanied with venous-hued complexion compels a bad prognosis.

"**Respirations After Resuscitation.**"—When a child has reached a state of equilibrium after the variations of delivery the respirations should average about 40 to the minute, with a tendency to fall to 35. When the rate runs higher than 44 a careful auscultation should be made to learn of any remaining atelectasis. The rate may be speeded by presence of mucus in the bronchii or from failure of the foramin ovale to close at birth. Too much care in observation of the pulse and respirations can scarcely be given the new-born child.

"**Weight at Birth, at Seventh Day, at Tenth Day.**"—The average weight of the male child at birth is 7¼ pounds, and of a female 7 pounds.

There is usually a loss of about 5½ ounces during the first two to five days. The weight is about the same on the seventh day as at birth, the loss being met by an equal increase. It is slightly higher at the tenth day than at birth.

It should always be borne in mind that the body weight is one of the most important evidences of condition that can be obtained.

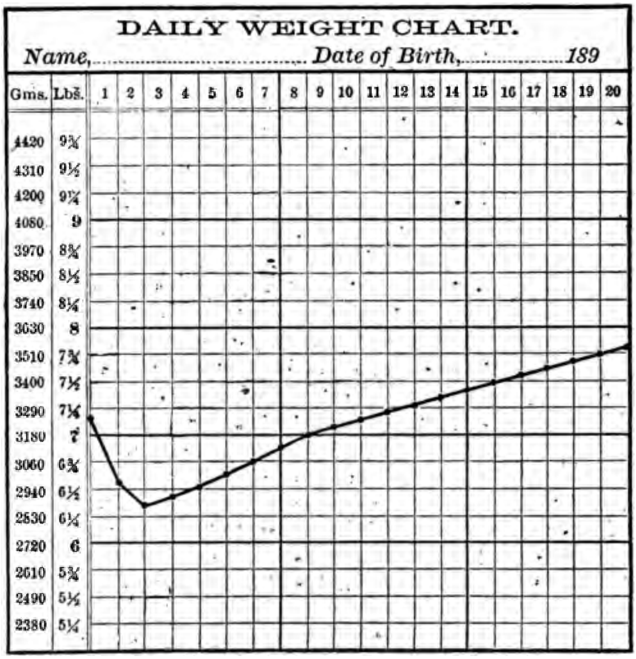


FIG. XLV.—Weight curve of the first twenty days (Holt).

When a child continues to lose weight after the third day it becomes most important to undertake to secure an improvement. A differentiation should be sought between mal-nutrition and various pathic causes, such as bronchitis, cerebral hemorrhages, birth wounds, swellings, various injuries, etc.

Head Mensuration.—The Chart History calls for a record of the various cranial diameters and of one circumference, that at the bi-parietal and sub-occipito-bregmatic plane; the special object of which is, for the record's sake, to secure the relative diameters existing between the head and the maternal pelvis; and for the student's sake to develop familiarity with head diameters and their variations in restorations from moulding.

In the great majority of labors the two important diameters are: The bi-parietal and sub-occipito-bregmatic. The circumference of the plane denoted by these diameters is to be recorded becauses it increases the accuracy of measurement.

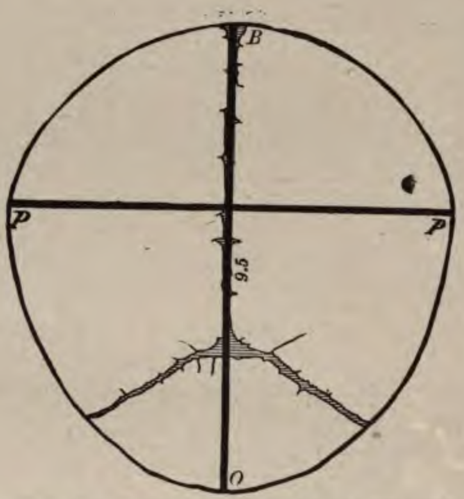


FIG. XLVI.—The plane of engagement of the fetal head. BO. sub-occipiti-bregmatic diameter. PP. biparietal diameter (from Jewett after Farabeuf and Varnier).

The average length of this circumference is 13 inches (33 cm.). The average diameters of the infant head at birth are:

Bi-parietal)B.P.)	3 3-5 in. (9.3 cm.)
Sub-occipito-bregmatic(S.O.B.)	3 3-4 in. (9.5 cm.)
Bi-temporal (B.T.)	3 1-8 in. (8 cm.)
Fronto-mental (F.M.)	3 3-5 in. (9 cm.)
Occipito-frontal (O.F.)	4 -12 in. (11.5cm.)
Cervico-bregmatic (C.B.)	3 3-4 in. (9.5 cm.)
Occipito-mental (O.M.)	5 1-2 in. (14 cm.)

The points on the skull from which these measurements are to be taken are best learned by means of the accompanying illustrations.

Variations in Diameters in Twenty-four Hours.—By retaking the several diameters in twenty-four to forty-eight hours an approximate knowledge of the extent of moulding which occurred during labor will be obtained. The head does not fully return to its ante-partum form in this time, and, in fact, never does, but it does to a very considerable extent, and study of these changes is of great value in relation to questions in dystocia.

In cases of severe moulding in vertex presentations the increase in diameters in the bi-parietal and the sub-occipito-bregmatic will be from ⅛ to nearly ½ inch in the second measurements over the first.

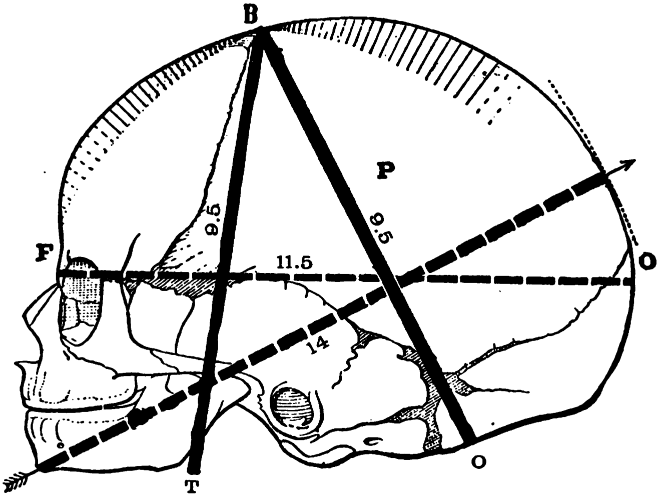


FIG. XLVII.—The diameters of the fetal head. O F occipito frontal, O B sub-occipito-bregmatic, B T trachelo-bregmatic. The maximum diameter, occipito-mental is indicated by the long dotted arrow. Centimeter scale. (From Jewett after Farabeuf and Varnier).

In private practice, where the physician expects to conduct successive labors in a patient whose pelvis is barely large enough in her first labor, it is of great value to have accurate head measurements as a guide in subsequent labors.

"**Defecation.**"—Until a movement of the bowels has occurred the possibility of some abnormality in the intestines should be kept in mind. Imperforate anus is the most frequent abnormality, though very rare in itself.

"**Micturition.**"—The same may be said of the bladder. Most babies urinate very soon after birth, but retention is too frequent to be disregarded. Micturition should be looked for until it has occurred.

Retention may be due to unphysiologic conditions or to congenital occlusion of the urethra.

"**Navel.**"—The condition of the navel should be recorded after the cord has fallen off. Sometimes a catarrhal discharge persists for some days. The creases should be turned out, washed and dusted with a healing powder. Hernia should be promptly discovered and a proper truss applied at once.

"**Fed by Breast, Wet-Nurse, Bottle.**"—Every mother should nurse her child if she can do so efficiently and there is no special contra-indication present. The enthusiasm resulting from the remarkable achievements of present day artificial infant feeding has led some of our most influential and able pediatricians to minify the added risk involved in artificial feeding. Mothers not infrequently refuse to nurse their infants because they have been told they can be nursed just as well and safely by artificial means. As a general proposition it may be said that the safest and most efficient nursing is that performed by the mother herself, if well; that between wet-nurse and artificial feeding there is very little choice if the latter is done in the best manner, but that wet-nursing is safer where the artificial feeding is not well understood and carried out. Special instruction should always be given mothers and nurses not to give the child anything but milk and, at times, a little water, there being a most pernicious custom with many women of giving a little tea, or gin, or brandy, or paregoric, or soothing syrup, usually because the child cries.

Some regulation of nursing as carried on, such as less milk, longer feeding intervals, etc., is indicated.

Contra-indications to Maternal Nursing.—The mother should not be asked or allowed to nurse her child who is suffering from tuberculosis, syphilis, nephritis, epilepsy, sepsis, hemorrhage, severe anemia, or malaria, insufficient milk supply, or whenever the child will apparently be better fed by wet-nurse or by artificial means.

Choice of Wet-Nurse.—The wet-nurse should be free from constitutional or local contagious or infectious diseases, of approximately the same post partum period as the child, abstemious of liquor, tobacco,or any drug habits. Her breasts should be in a healthy and aseptic condition, and, of course, with sufficient milk secretion.

Artificial Feeding.—It is impossible to properly present this subject here, but only a brief indication of the main features may be attempted. The entire question of artificial feeding sums up in efforts to either modify cow's milk to make it correspond in percentages of proteids, fat, sugar, and inorganic salts to human milk, or to modify the cow's milk to special proportions that may or may not correspond to mother's milk.

The most scientific method of modification is now attained in the milk laboratories established in our larger cities. In these institutions, by means of quantitative analysis of carefully provided milk, very exact proportions of milk constituents can be specially prepared on a doctor's prescription. By separating the fat and residual milk and recombining percentages of each with milk, sugar, and lime water, very accurate proportions of milk constituents are produced. The following from Holt gives a:—

Schedule for feeding an average healthy infant from birth upon modified cow's milk, showing percentages of fat, sugar, and proteids, and the daily quantity:

No.	Age.	Fat.	Sugar.	Proteids.	Daily Quantity.	
		Per cent.	Per cent.	Per cent.	Ounces.	Grammes.
I	First and second day	....	5.0	....	4- 8	125- 250
II	Third to seventh day	2.0	6.0	0.60	10-15	310- 460
III	Two to four weeks	2.5	6.0	0.80	20-30	620- 930
IV	One to three months	3.0	6.0	1.00	22-36	680-1,110
V	Three to four months	3.5	6.0	1.25	28-38	870-1,180
VI	Four to six months	4.0	6.0	1.50	32-38	990-1,180
VII	Six to nine months	4.0	7.0	2.00	34-42	1,050-1,300
VIII	Nine to twelve months	4.0	6.0	2.50	38-45	1,180-1,400
IX	Twelve to fifteen months	4.0	5.0	3.00	40-50	1,240-1,550
X	Fifteen to eighteen months	4.0	5.0	3.50	45-50	1,400-1,550
XI	Eighteen months (whole milk]	3.5	4.3	4.00	45-50	1,400-1,556

"Composition of Bottle-milk."—

Home Modification of Cow's Milk.—Milk laboratories are too expensive for and literally beyond the reach of the vast majority, and the really important need is, therefore, the simplest system of preparing cow's milk at home. Sufficient milk should be prepared at one time to last for twenty-four hours.

This will usually require about thirty-six ounces. It should stand in a quiet, cool place. The top milk is to be separated from the lower to reduce chiefly the per cent. of proteids. This separation may be accomplished either by syphoning off the lower milk by means of a rubber tube, first filled with water to start the flow when placed in the bottle and the outer end lowered below the level of the bottle. The water in the tube acts as a suction force.

If two-thirds of the bottle's contents are withdrawn and the bottle then refilled with sterilized water the mixture will contain about 1.2 per cent of proteids, 2.6 of fat, and 1.5 of sugar.

This per cent. of proteids corresponds to that of human milk, but leaves the fat 1.5 per cent under the amount, and the sugar 5.5 per cent less. Add 1¾ ounce of milk sugar to each quart of the mixture, and a tablespoonful of lime water.

The sugar should be dissolved in the water before it is added to the top milk. By only drawing off one-half the under milk the percentages will be: proteids 2, fat 3, and sugar 2.2. In diluting the remainder add 2½ ounces of milk sugar to the water, to be mixed with the top milk. The two-thirds withdrawal is usually best adapted to new-born infants up to five months, the one-half to those older. In warm weather it is best to partially sterilize the entire milk preparation. This is done by heating the milk to a temperature of about 158° F. After heating water in a large vessel to the boiling point, place the milk, which is in bottles with cotton in the necks, in this water and leave it thirty minutes, then run cold water into the outer vessel until the milk is cold and then place the latter in the refrigerator.

Even the above method of milk preparation is beyond the reach of a great many, especially the poor in cities. The most generally used food with these is condensed milk. In using this one part of the milk should be dissolved with nine parts of sterilized—boiled water. Most infants become puny and rachitic under this feeding.

The only system that will efficiently meet the needs of the poor in large cities must be founded on charity, the milk being served daily by laboratories.

"**Amount.**"—This has been stated in the schedule above. Quite marked variations in need and capacity for food are shown by infants, dependant, diagnostically, largely upon weight of the body. The child's weight is often a better indicator than its age as to feeding.

"**Frequency.**"—The following from Holt gives a most convenient and reliable table:

Schedule for Feeding Healthy Infants During the First Year.

Age.	No. of Feedings, 24 Hours.	Interval Between Meals, by Day	Night Feedings (10 p.m. to 7 a.m.)	Quantity for One Feeding.		Quantity for 24 Hours	
		Hours.		Ounces.	Grms.	Ounces.	Grammes.
3d to 7th day..........	10	2	2	1 -1½	30- 45	10-15	310- 460
2d and 3d weeks......	10	2	2	1½-3	45- 90	15 30	460- 930
4th and 5th weeks....	9	2	1	2½-3½	75-110	22-32	680- 990
6th week to 3d month.	8	2½	1	3 -4½	90-140	24-36	740-1,110
3d to 5th month.......	7	3	1	4 -5½	125-170	28-38	870-1,080
5th to 9th month......	6	3	0	5½-7	170-220	33-42	1,020-1,300
9th to 12th month.....	5	3½	0	7½-9	235-280	37-45	1,150-1,400

"**Further History.**"—There are many important facts in the infants' history worthy of record but which cannot be specified. Could the histories of infants born in our hospitals be carried on for a decade, taken in connection with the thorough records of pregnancy, labor, and the puerperium, they would be of tremendous value in respect to many methods employed in an obstetrical way.

CHAPTER IX.

MATERNAL POST-PARTUM HISTORY.

Care of the Mother After Her Confinement.

Beginning with the puerperium, it should be the special object of the physician to, first, prevent hemorrhage; second, overcome the shock and exhaustion of labor if there is any; third, secure proper emptying of the bladder; fourth, observe lactation; fifth, regulate the action of the bowels; sixth, prevent sepsis; seventh, secure proper uterine involution and position. These subjects are not mentioned in the order of their importance, but rather as they would present at the bedside.

The one exception being that of sepsis, which presents for consideration at the beginning and remains prominent to the very end of the puerperium.

Hemorrhage.—This topic has been considered in its immediate relation to delivery in Chapter VI. After a patient has been cleaned and put to bed after delivery there is always some danger of uterine relaxation and bleeding; the nurse in charge should know what to do and how to do as regards checking hemorrhage, if she is a competent nurse. No nurse should be considered obstetrically competent who cannot be relied upon to promptly apply fundal pressure, etc., in post-partum hemorrhages. It will be a good rule to follow in all cases to have the nurse sit by the patient and keep the hand upon the fundus uteri for at least one hour, and longer than this whenever there is any unusual weakness or indication of threatened uterine relaxation. All cases of placenta previa should receive about ½ dram of ergot every three, four, five, or six hours, respectively, during the first twenty-four hours.

Moderate relaxation of the uterus with slow and gentle bleeding and formation of blood-clot *in uteri* and without any external show of blood occurs in many cases. This may not attract attention by signs of weakness from blood loss, but will almost always cause after-pains. It is well to look upon complaints of the patient the first day after delivery of pains in the womb as evidence of this slow hemorrhage. Examination of the uterus gives a sense of enlargement and softness that is not normal and which is accompanied by abnormal pain on handling. The clots should be gently squeezed out if possible and the patient kept moderately under the influence of ergot and strychnine.

Patients should never be allowed to move about, turn over, or sit up, but be made to lie quite still during the first day.

Shock and Exhaustion.—It is only in special cases that patients require therapeutic treatment for shock and exhaustion of labor.

That which is caused by hemorrhage is exceptional to the meaning of these terms. The difficulties caused by congestion and edema, whether in the brain, lungs, or genital tract, best regulate themselves by keeping the patient recumbent and at rest, with some heart stimulation where indicated. The shock caused by hemorrhage is best met by the injection of saline solution. Patients frequently need artificial heat following delivery, the loss of blood, the exhaustion from violent muscular effort, the loss of usual nourishment during active labor, and the exposure of the body in final delivery while it is bathed in perspiration, all combine to produce a marked reaction. Patients often shiver while final cleansing is being done. They should always be covered with warm blankets at once, further toilet work being done under cover. The application of hot water bags or bottles to the limbs and body are grateful. Care must be taken not to place such articles too directly in contact with the skin, as very bad burns have frequently been caused by such gross carelessness. When a patient is being thus artificially warmed extra watchfulness should be maintained to prevent relaxation and bleeding of the uterus.

When a patient complains of thirst it is better to give water by rectal injection if she is not well out of the effect of anesthesia, allowing only some cracked ice in the mouth. Perfect quiet and darkening of the room should be afforded the patient as soon as possible after labor and the toilet are completed. The child should be placed in a separate bed and no one left with the patient but the nurse.

The Bladder.—Inability of patients to empty their bladders is quite frequent. The severe pressure of the fetus against the bladder during labor benumbs its sensibilities and creates a temporary paresis. It is a good rule to follow not to catheterize so long as it can be avoided. Secretion of urine is often slow and small in amount after labor on account of the great losses of fluid through perspiration and uterine discharges in labor. On the other hand, the bladder may have been improperly emptied during labor and have been pressed up above the pubes, leaving it distended after delivery.

Palpation and mictural history should determine the fact. A patient should not be allowed to sit up to get the bladder to act.

Hot clothes and water bags placed over the pubes are most effective means of exciting bladder action. Sometimes a patient can urinate by lying on her abdomen. A distended bladder is often a cause of uterine non-contraction. Catheterization in the peurperium always risks causing infection and is therefore a surgical performance requiring absolute asepsis. The catheter should be taken sterile from a sealed bottle. The vulva should be gently cleansed with bi-chloride solution and the instrument introduced without coming in contact with any tissue but the meatus.

The vulva should be held apart, exposing the meatus for this purpose. The old custom of manipulating under cover by a sense of touch is an unwise concession of surgical technique to false modesty. The only proper catheter in labor and the puerperium is one of soft rubber. Stiff glass or metal catheters should never be used in labor, and are liable to start false passages in the urethra in the puerperium. Where symphysiotomy has been performed a soft rubber retention catheter should be left in the bladder on completing the delivery as the thighs cannot be separated afterwards. Catheterization need seldom be performed before twelve hours after delivery and can generally go some hours longer than that. By waiting most bladders will empty themselves.

Lactation.—Questions relating to the advent of lactation have been considered in a previous chapter.

Defecation.—Emptying of the bowels after delivery may be said to be never contra-indicated except in cases of great weakness, or where they have already been thoroughly cleansed. Decomposition of intestinal contents is an almost natural consequence of labor.

The great reduction in abdominal volume from emptying of the uterus and the severity of pressure and disturbance of the intestines during labor combine to develop marked relaxation and stagnation of the intestines. Tympanites very often develops during the twelve hours after delivery. Many cases of post-partum temperature elevations are due to this decomposition of fecal material within the intestines. Severe catharsis after labor should always be avoided. If proper movements have not been had before labor, and much solid material is present, calomel (two grains of the triturate) is best, to be followed in six hours with repeated small doses (one dram) of magnesium sulphate. If the bowels were well emptied previous to delivery the patient should not be given a laxative before twenty-four hours as a rule. A laxative is always indicated on the second day, unless defecation has already occurred.

The Post-partum Clinical Chart.—It is the duty of every nurse to begin keeping records on some systematic form of bedside charts as soon as labor is completed. (See pages 244-245.)

The form herewith is intended to give a condensed general record of the usual lying-in period. Where more frequent temperature and pulse records are needed special charts must be used.

Lochia "Normal, Scant, Excessive, Hemorrhagic, Septic."—Following labor an atrophic process begins in the uterus and other parts of the genital tract which should continue until the return to normal non-pregnant conditions is complete. In a strictly normal or physiological gestation there should be practically no free blood discharge in the lochia. It should be composed of detritus of muscular

														DAY OF
	M	E	M	E	M	E	M	E	M	E	M	E	M	E
103°														
102°														
101°														
100°														
99°														
98°														
PULSE.														
RESP.														
VAG'L DOUCHE.														
MICT. AM'T.														
DEFEC.														

Post-partum.

THE MONTH																	
M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E

Bed-side Chart

cells, mucous epithelia, etc. It is rare, however, not to have considerable mixture of blood serum and corpuscles in the beginning of the flow. Following this red discharge—the lochia rubra—true hemorrhage ceases and a serous exudation characterizes it—the lochia serosa—followed by a more pus-like discharge—the lochia alba. The first variety usually last four or five days the second two or three days and the last runs from the eighth to the fifteenth day, or even longer.

The amount of the discharge cannot be measured in practice, but can be estimated readily by the nurse; the usual method being to count the number of napkins required in a day. The discharge averages about two pounds during the first four days, nine ounces in the two following days and about seven ounces for the remaining week.

Lochia "Normal."—There is no definite lochial discharge that can be called "normal" to the exclusion of all other forms. Just as perfectly healthy women may experience quite different menstrual discharges, both in amount and length of time, so will variations occur in the post-partum flow in different women. Approximately not more than one napkin every four hours should be required the first day or two after delivery. Even this number might represent an abnormal flow in some women of non-plethoric habit. The behavior of the uterus is an aid to correct definition of the flow. If the flow seems excessive, and with it there is relaxation of the uterus above normal; and, if with this condition a distinct reduction of the flow is obtained by stimulating uterine contraction, then it would be considered as an abnormal flow. There should never be any blood clot formation in a normal discharge. Any sudden changes in the amount of the flow, such as may be caused by turning over or partially sitting up, producing increased discharge; or sudden decrease caused by fever, are to be considered abnormal.

The color of the discharge, to be normal, should be a gradual change from blood at the beginning to yellowish-white at the end, corresponding to the periods named above. Dark red or brown lochia indicate the belated discharge of blood that has been retained for some hours, either coming from loosened thrombi from the uterine sinuses, or from clots formed during slow hemorrhage in the cavity of the womb and which are slowly liquifying in decomposition. Or it may arise from retained placenta.

Lochia "Scant."—Some women have scarcely any lochial discharge from the beginning of the puerperium, and are seemingly quite well, with no element of sub-involation of the uterus following. Scant lochial discharge does not therefore mean abnormal. Nevertheless close observation of the progess of involution should be sustained in any case of scanty flow. A sudden reduction in the flow should always be carefully and quickly investigated. It is caused by fright, worry, chills due to pneumonia, malaria—any febrile disease in fact, and especially by septic infection.

Lochia "Excessive."—Discarding the question of actual amount of the discharge, the best definition of an "excessive" flow is whenever it constitutes a drain on the system as a whole.

The lochial discharge is not normally a washing out, but an elimination, and should not require the use of healthy blood to carry away the post-partum excess of genital tissue. An excessive flow is almost always caused by uterine weakness, which, in turn, may be caused by any constitutional asthenia.

Lochia "Hemorrhagic."—This definition has already been defined to a large extent in what has been stated above. There might be an excessive purulent discharge, which would not be hemorrhagic in any sense. Any abnormal flow composed of fresh blood, or accompanied by clots is hemorrhagic.

Lochia "Septic."—To determine that a lochial discharge is "septic" is quite difficult. But two clinical means are available; microscopic or culture examination for germs, and odor. As the subject of puerperal infection will receive special consideration further on, the differential diagnosis of septic lochia will be taken up there.

"**Temperature.**"—There has been much argument in obstetric literature regarding the questions of temperature following labor. Many claim that any rise in temperature is septic in origin, while others name many exceptions to this cause. There is no doubt in the writer's mind as to the truth of the latter view.

Every obstetrician of experience has had cases of distinct rises and falls of temperature due to hysterical or emotional conditions, which flashed out and disappeared in a way impossible to any genuine septic temperature. Many other causes of temperature elevation than puerperal sepsis are recognized "beyond the peradventure of a doubt." It is, therefore, most advisable to undertake to differentiate the meanings of temperature variations in all cases.

A rise in temperature of one-half degree immediately following labor is rather to be expected, particularly if that labor has involved extended muscular exertion and the bowels were not well emptied at the beginning of labor. The tremendous labor put upon the emunctories in consequence of a hard labor may prove beyond their temporary capacity, producing partial stasis and consequent sapremic absorption quite distinct from that which may occur along the genital tract. Elevations of temperature in the puerperium may arise from constipation, malaria, typhoid fever, pneumonia, pleurisy, la grippe, hysteria, tuberculosis, the exanthemata and puerperal infection. Without entering into detailed discussion of the differentiation of these febrile conditions, the main points may be stated as follows: Palpation proves fullness of the intestines, with more or less tympanites. Free catharsis causes an immediate fall of temperature. Malaria: Previous history suggesting malaria, absence of sweat which should be markedly present in infectious fever, and the presence of the malarial plasmodium in the blood. Typhoid fever: Symptoms generally precede labor. Characteristic temperature range, abdominal spots, appearance of tongue, Widal's test and exclusion of genital infection.

All these means of differention may fail in some cases. The characteristics of typhoid fever are often so modified in complications with the puerperium as to lose their significance. Pneumonia: Shortness of respiration and lung consolidation. Pleurisy: Respiratory pain, rales and friction murmurs. La grippe: Involvement of the bronchi generally, pains all over the body, but more especially in the back and absence, usually, of involvement of the digestive apparatus. Hysteria: Emotional behavior of patient, sharp rise in temperature with as sudden fall under narcotic or sedative influence, and absence of clammy perspiration. Tuberculosis: Previous history and present lung evidence of the disease. The exanthemata: The characteristic symptoms of these diseases are present and easily observed. Rheumatism might be added to this list, as a disease that may complicate puerperal infection, or even mislead in making a diagnosis. It must never be forgotten that any of these diseases may exist in combination with infection, and each help to obscure the other diagnosis.

"**Pulse.**"—There is a marked falling of the pulse after labor, both in volume and rate; which seems to be due to a large extent to the removal of the nerve-centre excitation characteristic of pregnancy. We would naturally attribute the changes in the pulse to the emptying of the uterus and decrease in blood volume, but special investigations indicate otherwise, as the same changes follow abortions at an early period in gestation. The pulse may rate at 60, and as low as 40 per minute.

Following severe hemorrhages the pulse will be very quick—100 or more per minute—and lack volume.

"**Respiration.**"—Except in the presence of special diseases, there is no change in respiration from the normal in the puerperium.

Puerperal Infection.—Purperal infection is a disease caused by the presence of certain micro-organisms along the genital tract of woman during or after parturition. The morbid conditions present are either the result of absorption of the products of these germs, germ and tissue detritus, or of direct entrance of the living germs into the maternal tissues. The former variety is usually termed *sapremic* infection, in distinction from the latter which is ordinarily called *septic* infection. In the former there is no direct entrance of germs into the blood current, and therefore it might be clinically considered that with the complete cleansing of the surfaces from which absorption is taking place the morbid conditions would all end. The distinction is largely theoretical and difficult to determine at the bedside or in the laboratory.

The Germs that Cause Puerperal Infection. — The germs most commonly present in, and apparently the cause of puerperal infection, are:

The streptococcus, staphylococcus, gonococcus, bacillus coli communis, bacillus diphtheriæ, bacillus ærogenes capsulatus, and, rarely, the pneumococcus and bacillus typhosus.

Infection does not necessarily follow because any of these germs are present. They will not affect a perfectly healthy vulva or vagina, that is, one which has no abrasions. They will affect the placental site of the uterus after expulsion of the placenta so long as this site remains unhealed. Consequently two general factors are essential to infection, i.e., pathogenic germs and suitable soil. To understand the special means by which these two factors may prevail to induce puerperal infection constitutes one of the most important features of obstetric practice.

The sources from which these germs obtain are: From unclean hands, instruments, or anything carrying such germs brought in contact with the vagina; and from old abscesses, pus-tubes, or other infected centers existing within the patient independently, perhaps, of pregnancy.

The vagina has been the subject of close investigation as to its aseptic character, and is now looked upon as normally aseptic in its inner upper end, being even germicidal through its secretions and becoming less assuredly aseptic as the outer vulvar end is reached. The accepted view now held is that, unless pathogenic germs are carried into the vagina during labor and the puerperium there will no infection take place, except it arises from within, as mentioned above.

The responsibility for infection therefore rests upon each of those who may have touched the vulva during or shortly before labor or after delivery either with hands, instruments, or other articles.

The most frequent means by which germs are carried into the genital tract are by the fingers of the physician handling the patient.

It is a very difficult, if not impossible, undertaking to render the fingers absolutely aseptic. It is a very frequent thing for physicians, particularly those who have not acquired the habit of asepsis, to fail to keep their hands clean in the surgical sense after once having done their best to make them so; forgetting that a labor differs from all other surgical work in being extended over quite a long time and allowing their hands to come in contact with possibly septic articles in the times between vaginal examinations.

The physician may properly cleanse his hands and not the thighs, vulva, and the neighboring parts of the patient and so carry germs within the vagina by allowing his fingers to come in contact with these outside parts. Nurses may provoke infection by carrying germs upon the nozzle of the douche syringe and in many other ways. Contamination is a peculiar liability in confinements by reason of the close proximity of the anal region of the patient to the vulva.

In endeavoring to secure aseptic hands we must, as physicians, recognize that there are differences in infectious capacity between germs, and also that the hands can be less readily made surgically clean in some cases than in others. Thus, even with the same care in cleansing the hands after having handled a case of diphtheria or streptococcic abscess as in ordinary washing, there would be much greater liability of infection in the first two cases as compared with the latter. This, therefore, leads to a brief consideration of the principal germs involved in the etiology of puerperal infection.

The Streptococcus.—This germ is the most frequent and

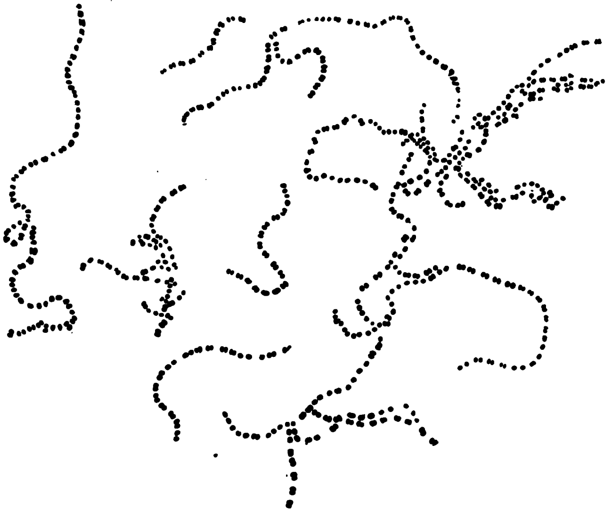


FIG. XLVIII.

dangerous of all. It is generally the leading factor in epidemics and is apt to be followed by the greatest mortality. The accompanying illustration shows the characteristic appearance of the streptococcus.

The Staphylococcus Aureus.—This germ, like most of the pus-producing germs, may be the cause of puerperal infection. The staphylococcus albus and citreus are not considered important in causing infection.

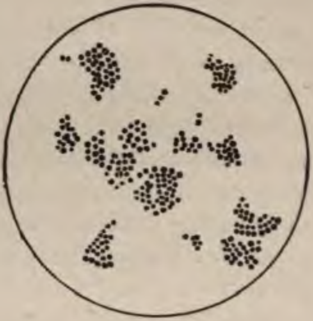


FIG. XLIX.

The grade of severity of puerperal infection when produced by an unmixed staphylococcus aureus infection is, generally considered, relatively mild. The germ may be present in very severe cases, but will be found mingled with other forms, generally the staphylococcus.

The Gonococcus.—This germ holds a somewhat peculiar place in its relations to puerperal infection. Most authorities consider it as one of the sources of infection, yet it is so often present in the genital tract through labor and the puerperium without infection being excited, that we feel at a loss to know just where it belongs.

It has been already discussed in Chapter IV., under the heading of "Vaginal Examination." It is, moreover, peculiarly difficult to render it innocuous when once established in the genital tract. It seems to burrow more readily than other germs underneath the surface, and run a more chronic and, to some extent, milder course; puerperal infections excited by it are generally mild and similar in degree of fulmination to staphylococcus infection.

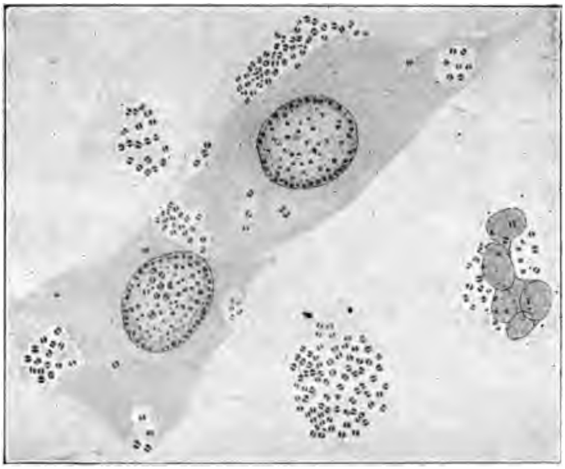


FIG. L.

While the endometrium is the special habitat of the streptococcus, the gonococcus is most apt to be the infectious agent when the disease arises from the tubes.

The Bacillus Coli Communis.—The habitat of the bacillus coli communis is in the intestine. Its proximity to the vulva makes it a germ of much importance in relation to infection. It exists in great numbers in the feces. It is considered capable of exciting a most virulent form of puerperal infection especially when associated with the streptococcus.

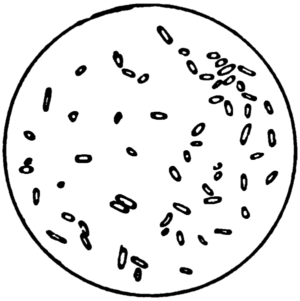


FIG. LI.

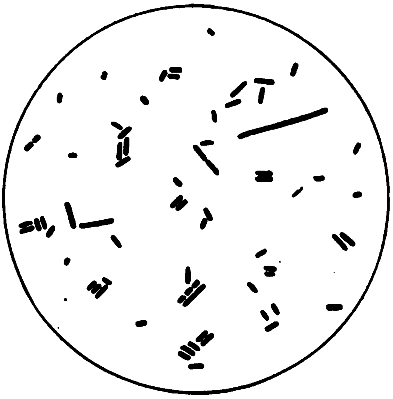


FIG. LII.

The Bacillus Diphtheriæ.—True cultures of this germ have been made from vaginal infectious membranes, and the disease has responded in treatment to the anti-diphtheritic serum.

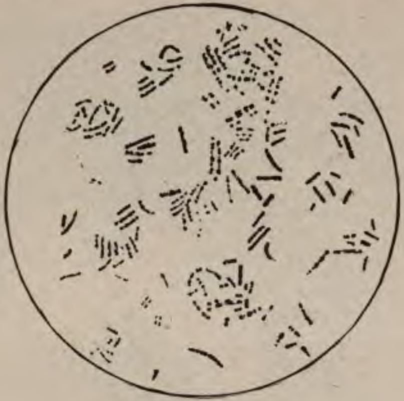


FIG. LIII.

Other germs, such as the pneumococcus, the bacillus ærogenes capsulatus, or gas bacillus, and, perhaps, the bacillus typhosus, are more or less involved in the development of puerperal infection, but those mentioned are the principal ones.

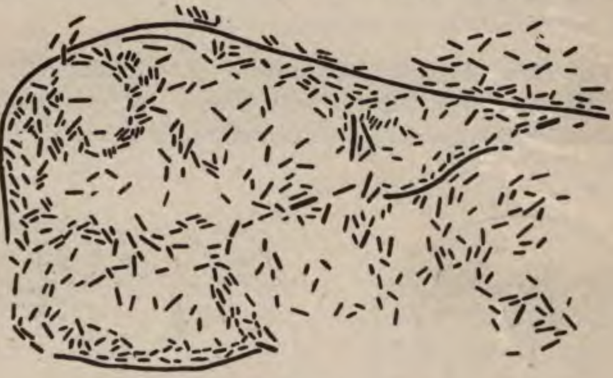


FIG. LIV.
The Bacillus Typhosus

Conditions of Tissue along the Genital Tract which Favor Infection.—It is as true of the laws of infection as it is of gardening, that the character of the soil has as much to do with results as the seed planted. Very highly infectious germs can be placed upon healthy normal mucous membrane and cause no infection. The vaginal and uterine conditions which favor the development of sepsis from germ contact are: Retarded circulation, which causes congestion, or edema, or stasis; this same, combined with anemia, which prevents proper healing of abrasions and ulcers; bruised, or abraded, or lacerated, or ulcerated, or gangrenous conditions of the tissues, and in all cases the presence of a raw surface at the placental site.

We recognize as elements producing a great variation in cases clinically: 1. Absorption from a superficial abrasion of the poisonous products of micro-organisms, simple or malignant in character. 2. The absorption superficially of the living micro-organisms themselves. 3. The entrance and retention of the micro-organisms or their alkaloids in the tissues beneath the surface by reason of obstruction to drainage or from anemia and weakness of the tissues. 4. The preference of some micro-organisms for certain tissues, or the equivalent, special exposure of certain tissues: for example, a deep laceration of the cervix exposing the lymphatics. Post-partum hemorrhage, by filling the uterine sinuses with clotted blood, exposing the veins; edema developed during labor, exposing the connective tissue.

These variations make the pathology of puerperal fever very complex, but a consideration of some anatomical conditions present, though adding to the complexity, is necessary.

The placental site following parturition is an unprotected, "raw" surface. The cavernous layer and basement glandular tissue of the mucous membrane, all that remains, is about 2 mm. thick, covered with a thin coagulum of blood and its meshes, which are abundant, are filled with blood clots. The first step in the regeneration of this membrane is resorption, or throwing off this blood clot and detritus. In a normal case from seven to fourteen days will see this stage completed. Another week will complete the regeneration of the glandular portion of the mucous membrane. This process is delayed where the vital forces are weakened, as following a severe post-partum hemorrhage. Underneath the mucous membrane the muscular wall of the uterus is pierced by the sinuses, which, having no circular muscular fibres, are only closed when the uterine body is contracted. These sinuses may be filled with coagulated blood. The lymphatics which arise in the mucosa and pass through the muscle to communicate with the subserous network are much exposed along the inner surface of the uterus.

The following classification aims to specify the variations that may prevail in genital wounds:

1. Vulvo-vaginal infection, the wound being a simple abrasion or a laceration of the vulva, or perineum, or vagina, rectum, or bladder; or a gangrenous slough which may occur in any of these structures. The infection may come from without and be either mild or erysipelatous, or from within from a labial abscess, rectal fistula, gonorrhea, or purulent leucorrhea. I should add, sutures introduced, which may create a deep-seated, confined infection.

2. Cervical infections—variations: simple abrasions, lacerations due to over-distention or to edema, gangrene from prolonged pressure or a torn lip.

3. Intra-uterine infection: decomposing blood clot, retained placental tissue, placentæ succuriatæ, retained membranes, gangrenous mucous membrane, decomposing polyps and fibroids, intercellular edema and abscess, blood clots in the uterine sinuses, phlebitis, lymphangitis, lacerations, and rupture. Sources of infection additional to those mentioned: abscesses in the Fallopian tubes, sloughing fibroids, and cancer.

4. Pelvic peritonitis—variations: abscesses extra-peritoneal around the uterus, abscesses within the peritoneum, the Fallopian tubes or the ovaries, hemorrhages, and intestinal perforations.

5. General septic peritonitis.

Diagnosis of Infection.——It is not by any means easy to diagnosticate the presence of puerperal infection, notwithstanding that many writers would so lead us to infer. There are too many other causes of temperature rise affecting the lying-in patient. The diagnosis can generally be made correctly, but the chances of error are too great to permit any assurance on our part.

A rise in temperature always accompanies infection. It may be preceded by a chill and temporary falling of temperature below normal. With the rise in temperature the first attention should be given to determining its cause. We must exclude, if possible, all other causes of fever. We can generally learn from the immediate history preceding labor whether the patient has had symptoms of phthisis, malaria, and typhoid fever; and exclude by the accompanying symptoms the zymotic diseases, diphtheria, influenza, and hysteria. The most likely of these diseases to cause uncertainty are typhoid fever, malaria, and hysteria. Very rarely cases of typhoid fever sometimes begin with and seem to be hastened by labor and are generally atypical and difficult to determine. Dependence must be placed largely upon blood examinations for Widal's test on the one hand, and absence of local uterine and vaginal tenderness and inflammation on the other.

Malaria has almost always a history of previous chills and fever. The skin is slightly jaundiced, and again the blood examination should reveal the presence of the malarial plasmodium. Hysterical fevers are not accompanied by chills and subside quickly on the administration of sedatives. The mental behavior is in hysteria one of great emotional disturbance.

Aside from hysteria, any great excitement or grief may similarly force up the temperature. Severe pain, as in nursing when the nipples are very tender, may develop transient fever. The most common of all causes of fever other than infection of the genitalia finds its source in the intestines. In all cases of doubt between this source and puerperal infection the bowels should be thoroughly moved. This will promptly end the fever if due to intestinal decomposition of contents, and is, likewise, good treatment if true infection is present.

It should never be forgotten that combinations of these various causes of fever may exist with puerperal infection.

Most cases of puerperal infection begin during the third or fourth day with a rise of temperature frequently preceded by a chill.

If the patient has been exposed to possible infection twenty-four or more hours before labor, as where the membranes were ruptured long before delivery, the initial fever may naturally appear sooner than usual. If the fever continues above 100° F. for twenty-four hours with recession, and the combination of symptoms gives no other clearly indicated cause, the diagnosis of infection should be made and held until positively excluded by some other definitely recognized disease.

The most frequent form of infection is endometritis. This will generally extend to any lacerations or abrasions that may exist on the cervix and vagina. It is not accompanied by marked uterine pain as is the extension to the parametrium, but is by relaxation of the uterine body.

The lochial flow may be checked by the chill and fever. Careful examination of it should always be made. The odor is a diagnostic assistant, but can easily mislead. One often thinks infection is present, judged only by the odor, when it is not. The septic odor is always present when infection is present. Examination of the lochia for septic germs is the most important feature in diagnostic effort. To accomplish this a sterile tube, such as Döderlein's (a ⅛ inch thick and 8 inches long glass tube) should be introduced within the uterus after cleansing of the entrance way attached to a small syringe, and some of the uterine lochial fluid obtained free from any contamination with vaginal or cervical fluid. This tube, sealed with wax at both ends, can be sent to a laboratory, where, by breaking it in the middle, the uncontaminated uterine lochia can be obtained and examined for germs. While most physicians are without the knowledge or means of carrying out this procedure, they can and should learn it. The time is near at hand, too, when such method of diagnosis will be essential to proper standard of work.

Such examination carries some risk of artificially extending a vaginal infection into the uterus. This objection must be considered. The findings from such examinations should determine whether the infection is sapremic or septic, and what germ or germs are involved.

An equally important step is now to learn as nearly as possible the exact condition existing within the uterus. There may be blood-clots present varying from small bits to large masses the size of one's hand that must decompose if not expelled, pieces of placenta, decomposing fibroids, a gangrenous endometrium, underneath which festering mass thrombi and germs rest in contact; and even portions of the musculature slowly sloughing and forming a septic plane of demarcation. Pus may be present at the tubes, existing prior to labor. A knowledge of the labor will be of assistance, local examination must determine the rest. We could exclude necrotic sloughing in cases of short labor but might suspect it where the fetal head has pressed upon a given point for several hours, or where the forceps have been used roughly and have possibly bruised a part severely. Fibroids must be recognized by direct palpation of the uterus. Blood-clots may be suspected where post-partum hemorrhage has taken place followed by more or less intermittent hemorrhage and severe after-pains. Examination of the placenta at the time of its delivery to see that it is all complete ordinarily proves that there is none left in the uterus.

There is a chance for error though, even though the placenta may seem to be quite complete.

Local appearances resulting from infection are such as may be seen in any suppurating wound, if the infection is not excessively virulent the abrasions upon the vulva, perineum, and cervix presenting a grayish, pus-covered condition, and a purulent discharge runs from the uterus if it is involved. In the severely virulent forms of inflammation the raw surfaces of ulceration will have cut-edged borders of a very red color, or they will be covered with dirty, brown necrotic tissue and borders that suggest an undermining process at work. The uterus in simple endometritis is less firm than normally, more tender. When the body of the organ is permeated with pus-channels it will be very soft, doughy, and painful to the touch. If the tubes are involved they should be felt as tumors closely attached to one or the other side of the uterus. When such involvement is unilateral the uterus will be pushed to the opposite side. In periuterine infiltration the hardened and thickened mass will almost always be readily felt lying behind and to one side of the uterus. It may feel elastic or boggy and contain either serum or pus. The trocar can determine which.

Treatment.—Summarizing the means of treatment of puerperal infection now employed we can mention: Uterine irrigation with either sterile or antiseptic solutions of hot water; curettement by finger or instrument, general supportive administration with alcohol and strychnine; ergot and local compression of the uterus to aid in expulsion of noxious fluids; local applications of carbolic acid or other escherotics to ulcers; drainage and packing of pus-pockets in the tubes or around the uterus; hysterectomy; high saline injections of the colon; local application of ice and partial exsection of the uterus and packing of iodoform gauze to check the advance of infection along the lymphatics.

From the practical standpoint, the first effort to be made once the diagnosis is made of puerperal infection, is to cleanse the uterus of any decomposing elements, such as remnants of placenta, blood-clots, etc. While most cases of infection begin at or near the vulva, yet it is rare that we find the invasion limited to this part. It is always best, however, to first cleanse the vagina thoroughly before making any exploration of the uterine cavity.

As an exploration of the uterine cavity involves some risk of introduction of infection which was not there, it is a good rule to first test the value of sterile water irrigation of the uterus before doing more. The patient should receive a thorough cathartic—1½ to 2 grains of the triturate of calomel, or 1 ounce of castor oil, or a full saline purgative first of all, unless the intestine is known to be well emptied. Plain sterile hot water is considered by many as effective as bichloride solution for irrigation of the uterus The latter can be used in strength of 1-5000, but care must be taken not to permit any of this solution to remain in any pocket of the uterus or vagina. Patients lying quiet on their backs after confinement may have such relaxed uteri or flabby vaginal walls as to permit retention of poisonous amounts of bichloride, even in the above weak solution. Peroxide of hydrogen is useful in suppurative conditions of the endometrium.

If a definite knowledge of what germs are present is obtained, and these are found to be of the sapremic varieties, we should expect to soon check the fever on removal of any debris present in the uterus. Such debris in this form of infection should include thrombi formed in the uterine sinuses. Therefore, in addition to digital or instrumental curettement we should endeavor to excite uterine contractions to cause expulsion of the blood-clots resting within the body wall of the uterus. Ergot, strychnine, and direct massage of the body of the uterus are the most effective. The ergot should not be administered in full single doses but in half-drams every three to four hours, or until ergotism appears. Massage, or rather, fundal compression, should be applied gently through a half-hour at a time rather than severely at one effort.

Much difference of opinion exists regarding uterine curettement.

If primary irrigation fails to check the fever, then the finger or large blunt curette should be introduced to learn the condition existing within the uterus. The finger is preferable when it can be employed. It is wise to wear a rubber finger cot, not so much for the patient's sake as to avoid self-infection from entrance of septic virus underneath hook-nails. If the uterine surface, particularly over the placental site, is found smooth and the cavity empty then no further efforts should be made in this line. We must then rely upon irrigations with sterile hot water, either continuously or at intervals, as thought best, combined with free administration of alcohol and stimulants, as indicated. The greater the amount of septic absorption the more alcohol—spiritus-frumenti—can be endured by the patient and to therapeutic advantage.

In connection with these means of treatment the injection high up in the colon of hot saline solution, "artificial blood-serum" will be found frequently helpful. The amount given should depend chiefly upon the patient's ability to retain it, usually from 1 to 2 quarts.

Germ Diagnosis in its Bearing upon Treatment.—We must acknowledge that at present we cannot take anything like an ideal advantage of individual germ diagnosis. If we find the gonococcus is the cause of infection it holds out a favorable prognosis of moderate febrile activity and early recovery, with special liability to the formation of secondary or, at least, more lasting pus-pockets in the tubes or parametrium. If the bacillus diphtheriæ is present we should at once employ anti-diphtheritic serum.

We all hoped that Mamorek's serum would prove a specific antagonist of the streptococcus in puerperal infection, but such hope is now almost altogether abandoned.

To venture a prediction, it will be along the line of individual germ diagnosis and consequent classified experimentation that true advance and improvement in treatment will obtain hereafter.

Operative Treatment of Puerperal Sepsis.—There are two classes of cases in which abdominal or vaginal section are indicated: 1. Those in which suppurative inflammation involves the tubes, ovaries, and pelvic cellular structures; and 2. Those in which the body of the uterus has become permeated with pus and which is mainly limited to that body.

As regards the latter form, the first question that presents is, to what degree do we ever have cases in which the infectious condition is so limited to the uterine body that its removal also removes the affected tissues complete; and, second, if a hysterectomy does not entirely remove the inflammatory foci, does it so improve drainage as to practically accomplish the end in view.

We believe that, leaving out theory and taking bed-side conditions as they seem to present, by the time we can make a safe diagnosis of such affection as to justify hysterectomy, such inflammatory process must have extended beyond the boundaries of removable tissues. But it does not follow that such an operation followed by thorough gauze drainage may not accomplish our object. It is a difficut question to decide upon, and each side of it has very determined advocates. Generally speaking, it is safe to say that if we make it a rule to resort to the knife we will operate upon many cases which would have recovered without operation and which die because of it; also, that some cases will be saved by operation only. The resort to operation should certainly be restricted to abdominal surgeons in any case and not be undertaken by others. The writer is strongly in favor of operating only in most clearly indicated cases, and, unfortunately, these are few and far between.

Pryor (**The Treatment of Pelvic Inflammations through the Vagina**), advocates in the first class of cases, mentioned above, incising the vagina into the posterior cul de sac and heavy packing of the region behind and beside the uterus with iodoform gauze which leads into the vagina. His theory is, that first the infected serum or pus always present in the lower pockets of the peritoneal cavity is drained away, and, second, the iodine liberated from the iodoform gauze is rapidly taken up by the blood, in which it acts as an antiseptic rapidly destroying all cocci in the pelvic tissues. He combines currettage and abundant saline irrigation with this procedure, adding direct intravenous saline injection in severe cases. He states that on laboratory test in every case treated by him all cocci had disappeared by the time the third dressing was employed.

"**Special History**" On completing the records of the post-partum history of a case there will always be found items of interest to record which do not receive special mention in the printed form of a history chart.

Involution of the Genital Organs.

No part of obstetric work is so much neglected as that pertaining to the final stage of the puerperium, the period when the patient is about to leave her bed and enter upon the more or less trying time of nursing. What her actual genital condition is is often an unknown matter to the physician—whether the uterus is in proper place and of the right size, whether it is badly torn, whether there is a diseased condition in the tubes or ovaries; these are things about which nothing may be known. There is much more excuse for such ignorance than often pertains to similar matters in other fields. It is very undesirable for anyone to make vaginal examinations in the immediate puerperal state unless directly indicated, and when the lying-in period is about completed the patient, breathing a sigh of relief and probably feeling relatively well, is constitutionally opposed to any more examinations.

From the time a patient is delivered it should be the special care of the attending physician to secure proper involution and a correct return to the normal position of the uterus. In order to do this he must begin at the beginning of the puerperium. The process of involution is a combination of atrophic reduction in muscular and endometrial cells with intermittent contractions and retractions of the uterus. Such contractions are generally more vigorous in primipara, and the uterus is at all times smaller than in multipara.

Conditions which Favor or Retard Involution.—These should be clearly understood; prolonged labor, uneven stretching of certain parts of the uterus, lacerations of the cervix or of the body of the uterus, infections, hemorrhages, peritoneal effusions and adhesions, and constitutional weaknesses, all interfere with healthy involution, either by weakening the muscular tonus of the uterus or by causing congestion and interruption of elimination, or by compelling displacements.

Each patient should be treated according to indications in the case. Moderate use of oxytocics, nerve tonics, and blood-making remedies should be combined with certain local treatment. Regulation of the bowels is important. In some cases a binder is useful, in others it is injurious. A certain amount of abdominal support and compression serve to hold the bowels in check from a tendency to asthenic relaxation and tympanic distention. The binder may also assist the uterus in a similar way. Pads should never be used underneath the abdominal binder as they displace the fundus. The best form of binder is a plain piece of muslin which reaches from the ensiform to a couple of inches below the trochanters. It should be adjusted to the body solely with safety-pins in preference to gores. A series of pins should be inserted along the median line a couple of inches apart. The great reduction in volume within the abdominal cavity after emptying of the uterus in labor is generally not offset by the abdominal wall contraction alone. Moderate compression with a binder favors normal circulation.

Involution would be favored by immediate repair of cervical lacerations, but such operations in the puerperium generally carried out would create a greater danger—that of sepsis.

Posture of the Lying-in.—There is room for much judgment in directing patients in positions they should occupy. There should be no fixed rule as to when they should lie on one side, or upon the stomach, or sit up, or get out of bed. It is bad for one patient to get up before two or three weeks, it is equally bad for another to stay in bed longer than seven to nine days. A change of position acts as a stimulant in some cases and causes congestion in others. All cases with lacerations of the uterus or cervix or perineum should be kept in a horizontal position until such lacerations have healed. Woman known to have suffered from prolapsus uteri should be kept in bed until involution is essentially accomplished; massage, and at times, hot douches after the fifth day, being employed. Cold sponge baths are useful.

Women previously having had retroversion should lie upon their stomachs as much as possible. Women threatened with subinvolution from inflammatory conditions can only be treated for the latter while they last. Retention of urine with full bladder checks uterine contractions and should be prevented. Subinvolutiun due to retained placenta or decidual hypertrophy calls for uterine curettement. No patient should sit up while the lochia is tinged red.

When it is serous or white, aside from the exceptions just mentioned, the patient should sit partially up in bed for a few minutes. If no effect is produced upon the lochia and no sense of weight or bearing-down in the pelvis is felt, this should be repeated every one, two, or four hours, the time being but a few minutes in which the erect posture is maintained. Among the educated class there is more fear of getting up too soon than late; the reverse is the case with the ignorant. Both are often in the wrong. The average time for women to lie in bed is from seven to ten days.

Diagnosis of Involution.—The physician should depend almost upon supra-pubic palpation to determine the behavior of the uterus. Vaginal examinations are allowable only when specially indicated and needed. Great aseptic care is best, even after the eighth day. Abdominal palpation of the fundus uteri should be made every day after delivery.

Chronology of Uterine Involution.—The process of involution continues from labor to from six to twelve weeks therefrom. It is usually completed by six weeks. It is evident that involution is not complete when the patient leaves the lying-in bed, and hence the obstetrician has generally ceased to attend her before its completion. That the process is advancing as it should, however, can be determined fairly well at the time the patient is discharged, i.e., three to four weeks.

The following table gives approximately the dimensions of the uterus from labor to six weeks post-partum.

TABLE SHOWING INVOLUTION CHANGES IN THE UTERUS FOLLOWING LABOR.

Time.	Length.	Breadth.	Thickness.	Weight.	Height of Fundus Above the Pubes.
First day	7-8 in.	4½ in.	2-2¾ in.	2 lbs.	5½ inches.
Second "	6¾-7½ "	4 "	2-2½ "	1 lb. 12 oz.	5 "
Third "	6-7 "	3½ "	2-2¼ "	1 lb. 8 oz.	4½ "
Fifth "	5½ "	3 "	2-2⅛ "	1 lb. 4 oz.	3 "
Seventh "	5-6½ "	2¾ "	1¾-2 "	1 lb.	2 "
Tenth "	4½-5½ "	2⅜ "	1¾-2 "	12 oz.	1½ "
21st "	4-5 "	2½ "	1½-1¾ "	6-7 oz.	Nearly level of pubes.
30th "	3¼-4½ "	2¼ "	1²⁄₈-1¾ "	3½ oz.	Level of pubes.
6 weeks	3-4 "	2-2⅛ "	1-1²⁄₈ "	2¾-3 oz	" " "

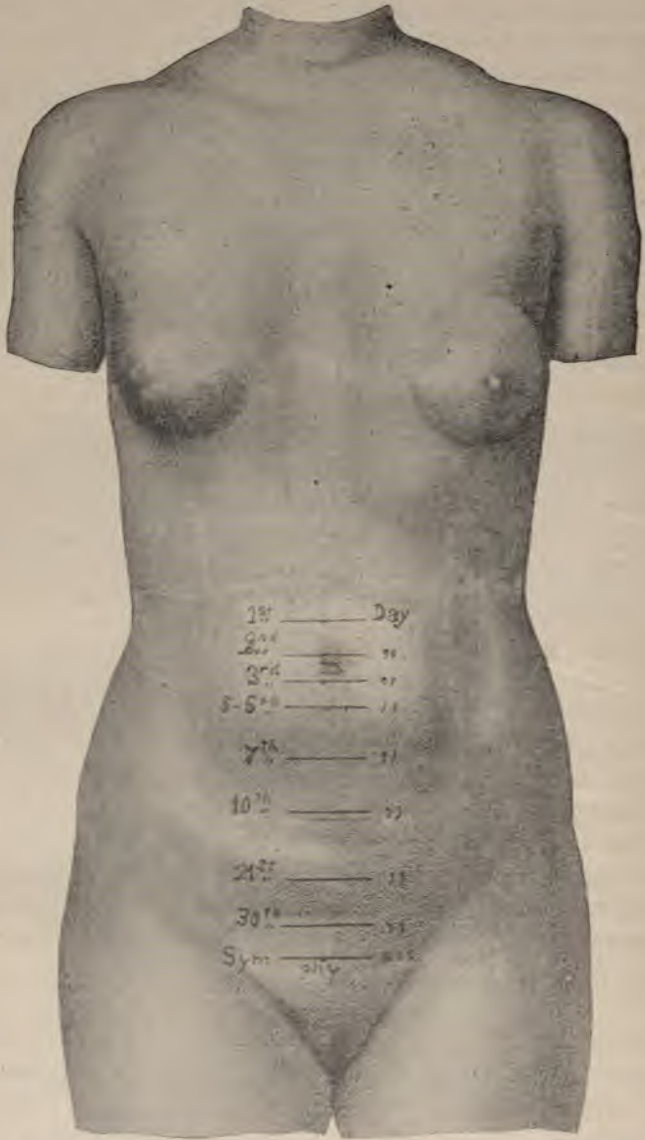


FIG. LV. Indicating Height of Fundus' Uteri during Involution from Labor to 30t day Post-partum.

CHAPTER X.

FINAL EXAMINATION.

The date of the final examination of the mother following the care of her through her confinement will usually be from nine to twelve days after labor in public institutions, while it will not be made in private practice much before one month after labor.

In public charity work this examination has a value in addition to the question of the patient's health of a medico-legal nature.

"Uterus, Size."—As shown in the table given above, the uterus at ten days post-partum time should measure 4½ to 5½ inches in length; 2 3-5 inches in breadth; 1 ¾ inch in thickness, weigh 12 ounces and reach about 1½ inch above the pubes. In a bi-manual examination these dimensions must be largely estimated by palpatory skill. The depth of the cavity can be easily ascertained with a uterine sound. This depth would represent the total length of the uterus, less the thickness of the fundus, which is close to ½ inch. When flexion is present allowance must be made in determining the true length.

"Diameter of Cavity."—The patient should be placed in Sim's position and the cervix exposed with a speculum. The uterine sound can then be introduced to the fundus and the depth noted. The sound should enter ten days after labor to a depth of 4 to 5 inches, twenty days after labor to a depth of 3 to 4 inches, and when normal again to a depth of 2½-3 inches.

"Position."—It is a matter of much importance to have the uterus assume a proper position as it returns to normal size. During the last months of pregnancy the organ is in an enforcedly retroflexed shape. In the non-pregnant condition it is somewhat ante-flexed. It should begin to bend forwards about the eighth to tenth day post-partum. Should it be found retroverted or flexed at such time as the examination may be made it is desirable to assist its return to normal. The displacement may be due to constipation, by which the fundus is pressed upon by the heavy intestines and is pushed back, or the ligamental supports are much relaxed, or adhesions are drawing it out of position. These should be treated.

The bowels should be kept emptied, relaxed ligaments toned up by hot water injections, and adhesions loosened by direct digital manipulation, as far as possible. Lateral displacements are usnally due to inflammatory exudates which push the uterus to the unaffected side or to peritoneal adhesions drawing the fundus to one side.

The most usual cause of displacements is subinvolution, which, in turn, is due to a combination of causes. Pains should be taken while subinvolution exists to prevent displacement by temporary vaginal supports and avoidance by the patient of the erect posture for any long time.

"**Mobility.**"—A post-partum uterus that is in normal condition should be quite freely movable. If it is not it is generally due to inflammatory interference developing since labor. The exceptions to this occur in cases having chronic disease of the tubes and ovaries.

"**Tonicity.**"—The degree of muscular firmness present in the uterus would depend, aside from any abnormal condition, upon the period of time after labor. The organ should grow progressively firmer as it approaches final completion of involution. It is always softer in a condition of subinvolution than it should be if properly involuting. By bi-manual palpation the posterior part of the cervix and the fundus can be gently pressed between the fingers and the tonicity determined.

"**Circulation.**"—The degree of congestion present in the uterus must be determined largely by the eye. If the cervix is large, soft, and of bluish-purple hue, and the body of the uterus feels soft and over-flexible, it can be safely assumed that the main circulation of the uterus is a congested one. Such diagnosis would be further confirmed if, on passing a sound into the cavity it is found to bleed readily; although this might be due to a condition existing only in the endometrium. The uterus is subject to markedly varicose conditions after pregnancy in some cases. Such a state may be a purely mechanical gravity congestion unaccompanied with inflammatory action.

"**Secretion.**"—By remembering the character of the lochial discharge in its normal aspects we will more reliably form an opinion in every case. As a rule, the red tinge should disappear by the end of a week, the change to a serous hue occurring gradually from the third to the eighth day post-partum. From the eighth to fourteenth day the discharge should gradually change from pale yellow to white, in some cases becoming purulent. The continuance of the red discharge beyond twelve to fourteen days indicates, if it comes from the uterine cavity and not the cervix, either a much relaxed body with true bleeding or a delayed granulation of raw surface. It does not call for local internal treatment, but tonic medication and hot douching of the vagina. The main point in this connection is, however, that such patient is not to leave her bed or be considered as out of her lying-in period.

"**Endometrium.**"—Diseases of the endometrium are very frequent, and while not sufficient often to prevent normal pregnancies, they are not cured by gestation and declare themselves early in the puerperium by the return of leucorrhea, from which the patients probably suffered previously.

Beyond endeavoring to bring about proper involution after labor the obstetrician can do but little to prevent the recurrence of this leucorrhea. Some forms of this endometritis are benefited by a gestation, usually those due to atonic conditions in young women.

Microscopical examinations of uterine discharges will show in the early form: lochia rubra, red blood corpuscles, blood fibrin and decidual cells, with shreds of placental tissue. The later form, lochia serosa, shows a gradually reduced per cent. of red blood corpuscles, increased amount of desquamated epithelia and admixture of serum from the blood. The lochia alba contains almost no red blood corpuscles, a large number of epithelial cells from the endometrium and a gradually increasing number of leucocytes. This change may finally give to the discharge that of ordinary pus fluid.

Germs should not be present in the first three days, but generally at the time of final examination.

The actual condition of the endometrium can only,be judged at the final examination by inference from the symptoms as just discussed. As compared with the process of involution of the uterine body as a whole that of the endometrium is more gradual.

The most frequently present and important condition that may be found at the time of the examination for discharging the patient is that due to the retention of placental tissue, and which calls for curettement. In such conditions the membrane bleeds readily when touched with the sound. Direct examination with the finger is the best means of diagnosis. Curettement should only be employed when no doubt is felt as to the diagnosis.

"**Cervix.**"—The condition of the cervix at the end of the lying-in period should always be carefully noted. Inasmuch as it is not generally considered wise to repair lacerations of this part immediately after delivery, it becomes all the more important to give it attention as soon as the proper time arrives. Most lacerations partially heal unassisted. They affect involution of the entire uterus unfavorably, sustaining congestion of the organ and producing subinvolution. At the

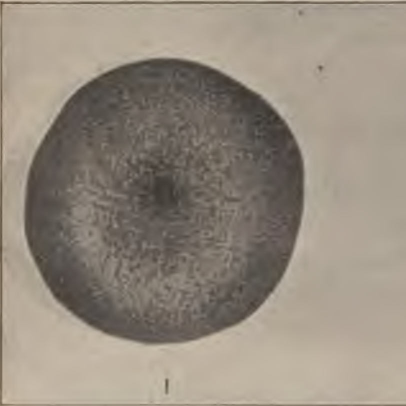


FIG. LVI.—Catarrhal Erosion of Nulliparous Cervix.

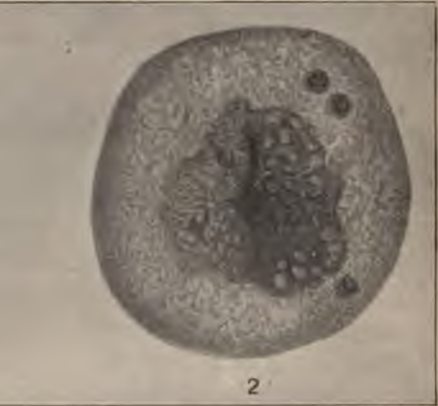


FIG. LVII.—Cystic Erosion of Parous Cervix with Slight Fissure.

end of three to four weeks it can be determined that the limit of self-healing has been reached and whether sutures will be helpful. The most harmful form of tear is the single bi-lateral laceration, depending upon its depth. This variety of tear interferes with the contractile power of the cervix and thus more directly affects the tonicity of the uterine body.

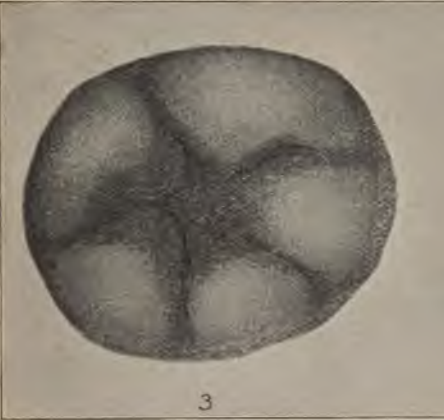


FIG. LVIII.—Deep Stellate Laceration without Eversion.

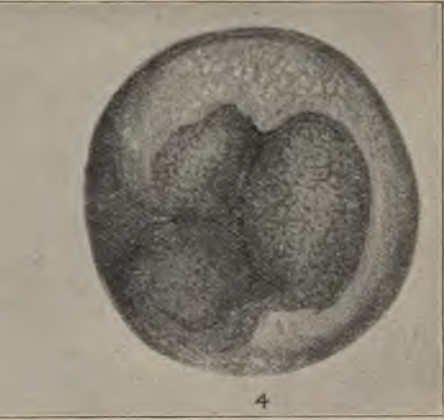


FIG. LIX.—Slight Laceration with Eversion and Cystic Hyperplasia.

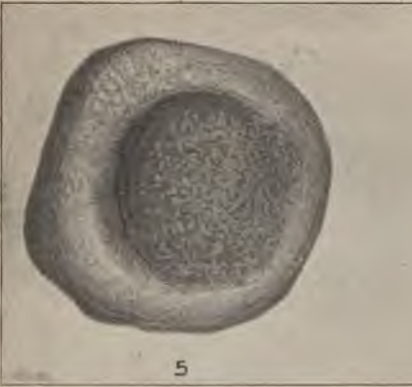


FIG. LX. Slight Laceration with Cystic Hyperplasia and Eversion of Anterior Lip.

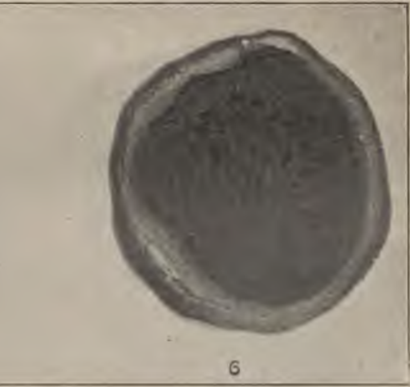


FIG. LXI. Laceration of Muscular Tissue of Cervix not Involving External Os, but Producing a Relaxed Gaping Condition of that Orifice.

When congestion of the cervix reaches a severe degree?

accompanied with laceration, an eversion of the inner raw surface takes place, with granulations of the surface tissues.

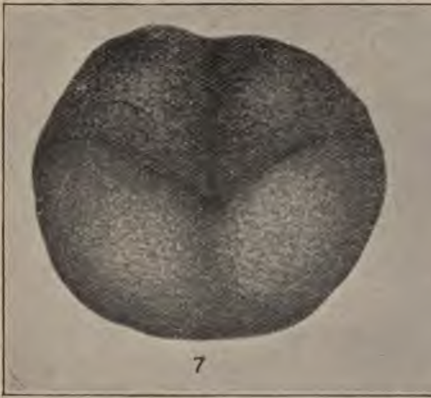


FIG. LXII. Deep Unilateral Laceration with Eversion.

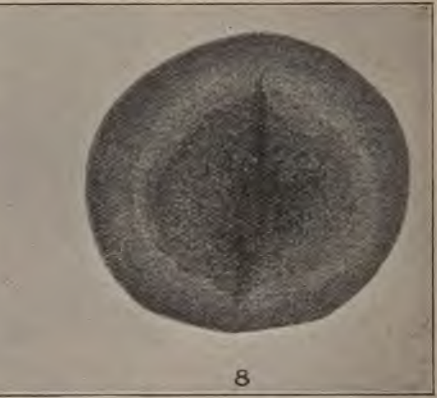


FIG. LXIII. Slight Bilateral Laceration with Eversion.

When should secondary repair of the cervix be performed, The proper time will depend on the conditions existing in each case.

It would not be wise to operate while there is a purulent discharge bathing the surfaces of the cervix, otherwise the operation can be done to best advantage as soon as all raw

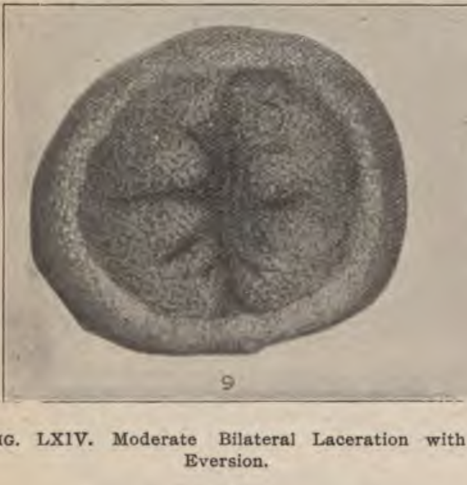


FIG. LXIV. Moderate Bilateral Laceration with Eversion.

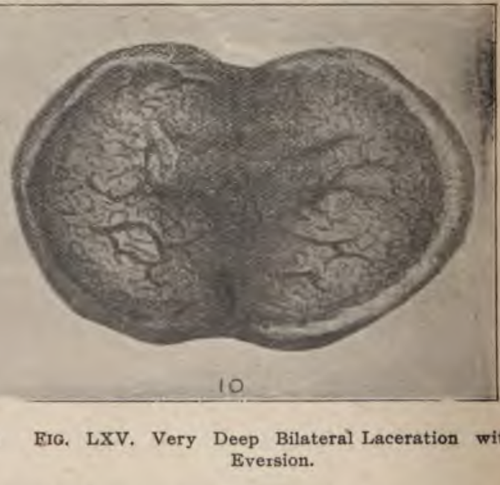


FIG. LXV. Very Deep Bilateral Laceration with Eversion.

surfaces are healed. The third and fourth weeks after labor are favorable times.

At these times the cervix has assumed its normal outlines, the tumefaction of labor is gone, and at the same time the period when it might most cause subinvolution of the uterus is anticipated to a large extent.

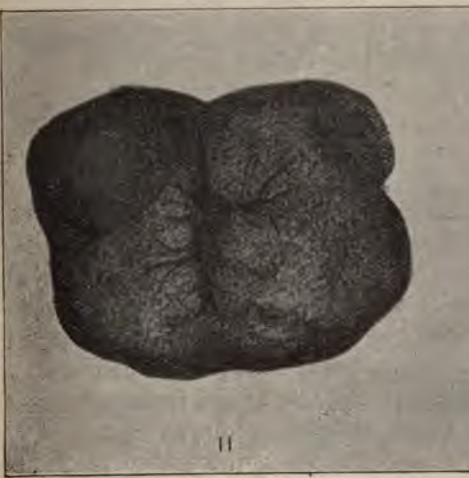


Fig. LXVI. Deep Bilateral Laceration with Eversion, Nearly Cicatrized but with both Upper Corners Showing Fresh Breaking Down of Cicatrix (Ulceration.)

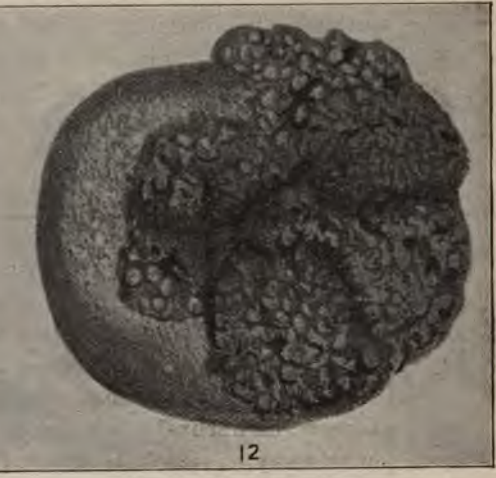


Fig. LXVII. Cystic and Papillary Hyperplasia Simulating Epithelioma. (Cervical Cuts after Mundé.)

The liability to septic puerperal infection is removed, if the conditions making an operation suitable, as given above, are present.

"**Perineum.**"—The final examination, or one made in two or four weeks after labor, should always find the perineum in proper condition, as it should always be repaired when lacerated, immediately after labor. Only in cases of infection should we find the perineum ununited at the late examination. If it is not properly repaired, then it should be attended to, and generally the sooner the better, though this is not so urgent in time as in the case of the cervix. It does not affect involution during the lying-in period, its chief influence for evil begins when the patient gets upon her feet.

Repair should not be undertaken while any septic discharge is present. Slight tears, which do not affect the support it normally gives to the soft parts above need not be stitched; nor should a return to the primary condition be sought when the small dimension of the ostium vaginæ renders laceration very probable in the next labor. Skill can prevent tears in normal perinei of very small outlets, but it cannot save a cicatricial perineum that has made the outlet smaller than should be desired for deliveries.

"**Bladder.**"—Seldom does the bladder require any treatment after the lying-in period. Retention, incontinence, cystitis and vesico-vaginal fistula are the possibilities to be looked for. Retention usually lasts after labor only a day or two and is due to the paresis caused by severe pressure of the fetal head *en passant*. Incontinence is due to overstretching, or tearing of the sphincter vesicæ, or to vesico-vaginal fistula. The first condition is caused in labor by head pressure with the bladder incompletely empty, or similarly from bad use of the forceps, or from the natural tendency to cystocele which follows symphysiotomy in which its natural support against the pubes is weakened. The incontinence almost always disappears without any treatment. When due to fistula the latter should be closed as soon as possible. The scalding of the vulva and introitus vaginæ, so bitterly complained of by patients so suffering, and which shows itself by slightly raw surfaces within the vulva, indicates the presence of either incontinence or fistula. The patient knows if incontinence is present. If a fistula is present and cannot be found, the bladder can be injected with milk and the vagina watched for its escape from the bladder. Cystitis is the most frequent of bladder disorders after labor. It indicates the presence of germs, usually of the milder types such as the diplococcus, and these generally reach the bladder during catheterization, though they may travel up the urethra, especially when it is dilated or abraded. Cystitis is favored by the weakened condition of the bladder, over-long retention of urine and unusual desquamation of the epithelial surface of the mucous membrane. Cardinal points in treatment are: absolute quiet in bed, alkalinity of urine, boracic acid irrigation and otherwise as perfect rest for the bladder as possible. Pyelonephritis should be kept in mind in severe cases of cystitis.

"**Fallopian Tubes.**"—One or both tubes may have been diseased before pregnancy or labor; seldom both, as that makes impregnation difficult. They may become inflamed during the puerperium.

They are liable to become adherent to adjacent parts after labor. Any such conditions existing should be discovered at the final examination. When disease is suspected and the vaginal examination is not satisfactory, more direct palpation can be had with the finger in the rectum.

"**Ovaries.**"—The ovaries may have been injured during labor by bad use of forceps, or by improper compression of the uterus in the third stage of labor, in which the hand grasps the body to compress with the fingers at the sides of the uterus instead of in front and behind the fundus. The treatment of the tubes and ovaries belongs in the field of gynecology entirely.

"**Breasts.**"—The breasts have already been discussed in the lying-in period, but are mentioned here that a record of their condition may appear. Their size, character of the milk secretion, abscesses; nipples, fissures and abrasions; quality and quantity of the milk, are points to observe.

"**Urine.**"—Ordinary urinary analysis is worth the while at the final examination; tests for sugar, albumen, pus, bile crystals and germs being specially held in view. Eclampsia is essentially out of the question at this time.

"**Anus.**"—So severe is the effect of passage of the fetus through the outlet upon the sphincter ani that one is rather surprised not to find more lasting harm done the part. Lacerations involving the sphincter ani and hemorrhoids are the most likely difficulties following labor. Fistula in ano is quite rare. Acute hemorrhoids after labor only occur in the first few days and are a form of rectal prolapse, due to the extreme stretching of the sphincter by the fetal head as it passes over it. Subacute conditions may prevail for some weeks after labor. The treatment of these cases has been heretofore considered.

"**Prominent Features of the Case.**"—To make a history chart of an obstetric case thorough it is necessary to make it extended and cover many points of variable importance. Almost every case has some special features which it is desirable to sift out of the whole and record where they can be readily noted. The greater one's experience the more does this become true, both as to the need of special culling of data and as to the ability to note such features. To attempt to enumerate these features would be to give a catalogue of obstetric phenomena. A large number of obstetrical questions have been well determined in statistical summaries of extended lists of cases by many careful observers, but no matter how many questions are settled there will ever be quite as many tagged with the interrogation mark, and they should be saved from the danger of oblivion that lies in a great quantity of material data.

Conclusion.—In finally discharging a patient after attending her in confinement the physician should always advise her as to a subsequent pregnancy. It would not do to assume that she will judge wisely for herself. The speed with which one pregnancy follows another, particularly among those least fitted to bear children—the poor—is one of the greatest evils of married life.

Aside from the financial phase of the question, the purely obstetrical point should be carefully determined. Generally speaking, a woman should not become pregnant until menstruation has returned.

Menstruation may begin six weeks after labor, but may be very much longer delayed in nursing women. Aside from this point, both the local and constitutional conditions should be considered, and if a patient is not in normal condition, or if a gestation would probably lower the patient's health, then she should be not only advised to avoid impregnation, but instructed how best to prevent it. Some of our statutory laws are antagonistic to the letter of such matters, but were not intended to force unhealthy burdens upon womankind, and would be very inconsistent if they did while countenancing sexual relations for purposes other than for impregnation.

THE END.

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